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Testing Room for Automobile Engines

The Noteworthy Equipment of the Continental Motor Mfg. Company, Detroit, for Testing without Danger of Explosions

—BY HARRY C. SPILLMAN—

One of the greatest troubles in automobile manufacturing is the block test room. Unless the engineer has had considerable experience in this line of work he will find explosions and fires in this department a common occurrence and the motor test department closed a large percentage of the time waiting for repairs.

Experience has shown that a new motor, when first starting to run, will usually miss fire in one of its cylinders

Motor Mfg. Company, Detroit, was planned these items were carefully considered and also the handling of motors with the utmost dispatch.

The building is of one-story construction, having a monitor roof and made strictly fireproof, not a single stick of lumber being used. Structural steel is used for the frame, with steel sash extending the full width of the columns. This gives a maximum amount of light. In



The Fireproof Test Room of the Continental Motor Mfg. Company with Its Four Rows of Testing Stands

and the gas from this cylinder, which is of an explosive mixture, enters the exhaust line. Probably the motor next to this one is taking a rich mixture of gas from the carbureter which causes it to send a stream of flame into the exhaust line. This flame will ignite the mixture of the explosive gas from the other motor and an explosion occurs. There is more or less lubricating oil discharged from the gas engines, which settles in the bottom of the exhaust line and which the explosion generally ignites. A fire in the block test is generally disastrous, as gasoline is used in motor testing and there is more or less gasoline and oil on the floor. When the block test room of the Continental

order to have good ventilation sash have large openings and the entire length of the monitor sash can be opened by means of sash operators.

A 1-ton Shaw electric crane runs the full length of the test room and shipping department, the motors passing directly from the assembly floor into the test room on small assembly stands. The electric crane picks them up and places them on the test stands and also delivers them into the shipping room and assists in loading them on trucks.

To avoid explosions the motors exhaust into a trench which has loose covered plates so that the trench can be

inspected and cleaned at any time. These exhaust trenches run from one large trench to the center of the room, which is connected to a large exhaust fan. This exhaust fan is located in a fireproof room separated from the main room by a fire wall. The fan is a large Sirocco fan having a capacity of 40,000 cu. ft. of free air per minute at 6 oz. and is direct connected to a 50-hp. Wagner motor running at 480 r.p.m.

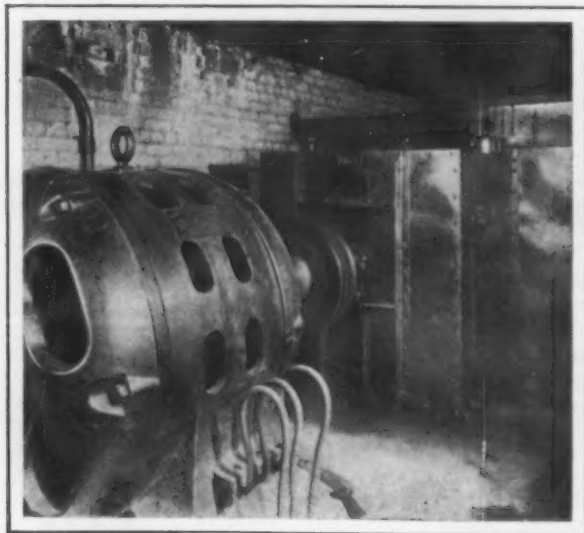
To avoid explosions an opening is left near each engine exhaust which pulls in fresh air and dilutes the exhaust from the engine. This causes the explosive mixture to become very weak.

To take care of fires in the tunnel, metal doors hinged at the top are suspended in each branch tunnel. These doors are held open by means of chains and fusible links so that in case of fire they drop automatically and confine the fire to one section. All the refuse oil which collects in these trenches is drained away from the fan. A sprinkler line is installed in the main trench having standard sprinkler heads. As a further protection the ceiling of the room is equipped with a complete sprinkler system and six 2½-in. hose lines are along the side walls.

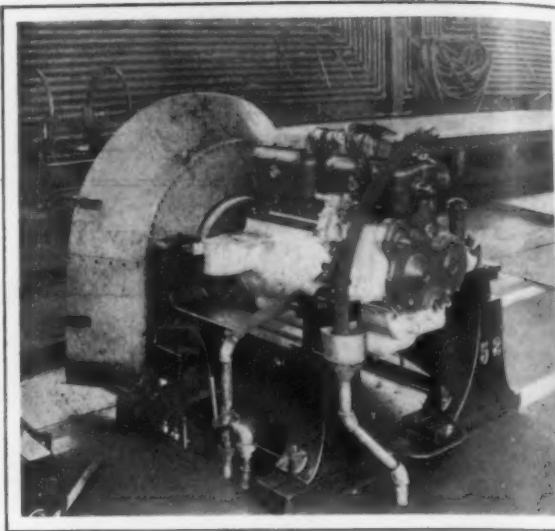
In order to only have a small amount of gasoline in the building a 15-gal. tank is erected on the wall and is fed by a Bowser two-cylinder motor-driven pump direct-connected to a 3-hp. Wagner motor. This pump works continuously, taking the gasoline from a 1200-gal. storage tank and discharging into the small tank in the building. The small tank has an overflow returning to the storage tank. This system allows a constant head of gasoline feeding to the motors. The gasoline piping is of brass and located below the floor line. At each motor stand is a small ¾-in. outlet and a quick connection can be made to the carburetor by a short piece of flexible tubing.

The water is circulated by means of a Union centrifugal pump having a capacity of 1000 gal. per minute. This pump is direct connected to the Wagner motor mounted on the same bed plate. The pump discharges the water into a 1200-gal. storage tank which has a 6-in. line feeding the motors. The water after circulating around the motor cylinders returns to a hot well where it is returned to the storage tank by means of the centrifugal pump. At each motor the water feed line is connected to the motor and return line by means of a three-way valve. The valve in the first position is closed, in the second position it connects the feed line to the motors, and in the third position it closes the feed lines and opens the return which allows the tester to drain the motor directly into the return line instead of allowing the water to run on the floor. The feed water after passing around the motor cylinders goes to the return line by means of another connection separate from the one controlled by the three-way valve.

The water passes through a gauge glass which shows at all times if the water is circulating around the cylinders. This water circulating system is designed to keep the temperature of the water between 160 and 200 deg.,



To Avoid Explosions an Exhauster is Used to Dilute the Gases Delivered into the Loose Covered Trenches into Which the Engines Exhaust



One of the Automobile Engines Mounted on Testing Stand

and a thermostatic valve installed in the 1200-gal. storage tank automatically opens at 200 deg. and discharges the water into the feed-water heater located in the power house, where the water is fed into the boilers. As soon as the water starts to lower in the tank it is made up by cold city water controlled by a float valve. This storage tank also has an overflow to the hot well and a drain which makes the circulating system entirely automatic.

The ignition to the motors is done by means of a small motor generator outfit having a range from 6 to 12 volts. In order not to affect the voltage when another motor is started, the fields of the small generator are separately excited at 110 volts. This allows a constant voltage regardless of the load. A fuse is located at each motor in order that a short circuit will affect only one motor. Tests show that each motor uses about ¾ ampere of current.

Test stands are built with adjustable blocks so that the stands will hold different models of motors. A large cast-iron drain pan is under each stand to collect all the oil. These stands are all connected to a drain pipe which collects the oil which is spilled and returns it to the storage tank. The oil is carefully filtered after being used and great care is taken to have it entirely free from dirt and other foreign matter. The reclaimed oil is mixed with new oil in order to keep the quality of oil to a high standard.

The entire room is illuminated by means of A. B. flaming arc lamps, using yellow carbons. Yellow rays from a flaming arc penetrate the smoke better than any other form of artificial illumination. At each motor stand an outlet is provided for an extension cord which gives the testers a lamp at each machine.

The motors are run in by belts for three or four hours before going to the test blocks. In the test room they are run in by their own power for 4 or 5 hours, and the oil pan is taken off and the bearing inspected. They are then run for 3 hours and again looked over. The night testers then take the motors and run them continuously through the night under load. The next day they are carefully torn apart and thoroughly examined and adjusted and placed on the block for final running, where they are tuned up and made ready for shipment. The test room handles this work in a very efficient manner and is designed to take care of 115 motors per day.

Henry R. Merton & Co., Ltd., London, take an optimistic view of the copper situation in their circular issued April 12. After commenting on the heavy reduction in American copper stocks in March, they say: "The withdrawals of stocks from British and Continental warehouses have again been on a substantial scale, so that in view of the heavy purchases made for this and next month there is reason to anticipate a further considerable shrinkage in the visible supplies; it is indeed quite possible that within a few months we shall again be face to face with the exceedingly small reserve stocks experienced last summer."

The Annealing of Steel Castings

Extensive Investigations Showing Its Effects
on Structure—The Slow Cooling Process
Is Best for the General Run of Castings

—BY EDWIN F. CONE

The annealing of steel castings is becoming more and more important. Not so long ago purchasers, and consequently producers, gave little attention to this matter. A superficial or thorough annealing passed inspectors and others. Castings that were "red," or whose original metallic appearance had been changed, were "annealed." In very recent years, however, a decided change has taken place. This has been brought about principally in two ways. Some producers have sought a higher standard in their product, and purchasers, the railroads in particular, have studied the subject and demanded thorough annealing. The result is that steel casting producers in general have gone into the subject practically and scientifically. They have improved and enlarged their annealing and heat-treating facilities, and have studied the process by means of the microscope.

Effect of Annealing on Structure

The necessity for a proper heat treatment of steel castings can best be appreciated by a brief metallurgical and metallographic presentation of their crystalline structure when cast. Any steel casting when untreated is a mass of

Slow Cooling and Quick Cooling

Two methods are generally used by steel foundrymen for annealing their castings. These are usually designated as the slow-cooling and quick-cooling processes. The first consists in bringing the castings to a temperature just above the recalescence point, holding them at this temperature for a length of time sufficient to permeate them, this depending on the size of the casting, and then in allowing them to cool slowly in the closed annealer until nearly black. The second or quick cooling method is the same as the other, except that as soon as the castings are thoroughly heated through they are exposed to the air by either removing the covers or drawing the car containing the castings out into the air. Strictly speaking, this last process is not annealing but air-tempering. Annealing carries with it as part of its definition the idea of slow cooling, and this is the general acceptance of the term. If the quick-cooling process becomes general there should either be a change in nomenclature to embrace both methods or specifications should designate which method be used.

The relative merits of the two methods depend upon



Photomicrographs About Two-thirds Original Size Taken at 87 Diameters. Nos. 1, 2 and 3 Structure of Medium, Large and Small Carbon Castings Respectively

crystals of various shapes. The size and variety of these depend on many factors—the method by which the steel is made, the temperature at which it is poured, the rate of cooling, the size of the casting, etc. Large and small crystals, laminated and angular ones, are in juxtaposition throughout the casting. This is vividly illustrated by means of Figs. 1, 2 and 3. Fig. 1 represents the structure of a medium-sized steel casting; Fig. 2 that of a very large casting, and Fig. 3 the structure of a small casting. They are all acid open hearth carbon steel and fairly representative of all castings of these sizes. It is hard to realize that all of these represent untreated steel castings. The variation is caused largely by conditions of cooling as affected by the size of the casting and the temperature of pouring. The difficulty of securing uniform structures and the best physical results by treating a group of such structures in one and the same annealer is readily appreciated, though this is attempted by a large number of steel foundries.

There can be but one consequence of the use of castings in the green condition—a steel considerably weakened by a non-uniform inter-knitting of vital parts. A casting going into service in that condition will probably fail sooner than one so treated that its constituent parts are intimately united. To bring about this closer union of crystals and to remove the resulting internal strains, steel castings should be thoroughly annealed.

the results to be achieved. So far as the breaking up of original structure is concerned, either process is effective. Opinions differ, however, as to whether the quick-cooling process does not leave certain internal strains in some sections of the castings which the slow cooling prevents. This would be especially true of castings of uneven section. The writer has known, in the case of castings made from the same pattern, of frequent failures of some of them. A partial investigation showed that those that had failed had been annealed or heat-treated by the quick-cooling method, whereas no case was found of failures of any of those annealed in the other way. These castings were of uneven thickness and the failures took place in the heavy sections. It is highly probable that in the case of castings of thin and fairly uniform section the quick-cooling process is entirely satisfactory in every particular, and of course much more expeditious. The fuel used, whether coal, gas or oil, is a matter of local management and availability.

Types of Annealing Furnace

The design of the furnace is a very important matter and depends upon the kind of castings to be treated. Small castings are often annealed in a small or car annealer and large ones in a so-called pit annealer. In the latter the best results are obtained by locating the source

of heat on one side instead of the ends, thereby insuring an even heat distribution. In any event, small castings should not be annealed with large ones. It is the practice in many foundries not only to anneal large and small castings together, but to do this in a large annealer approximating 34 ft. long by 8 to 10 ft. wide and 5 to 6 ft. deep. The great objection to this procedure is not so much in the mixing of large and small castings, though this is bad enough, but in the fact that it is usually impossible to obtain uniform temperatures throughout such a large annealer, whether the source of heat is at the side or ends. Careful tests of such an annealer, both microscopic and thermal, made by the writer, showed wide variations of temperature in different locations and decided fluctuations in physical results. This was especially true of castings located near the source of heat and thus frequently over-heated. Regulation and uniformity of temperature are essential to the best results. It would seem that the time is not far away when progressive foundrymen must adopt means whereby castings of similar design and section can be heat-treated in furnaces properly suited to the size of the castings.

Effect on Physical Properties

There is another point of view from which the two methods of heat treatment should be regarded, and that is the effect on the physical results. If the object to be

A careful examination of this table reveals the following:

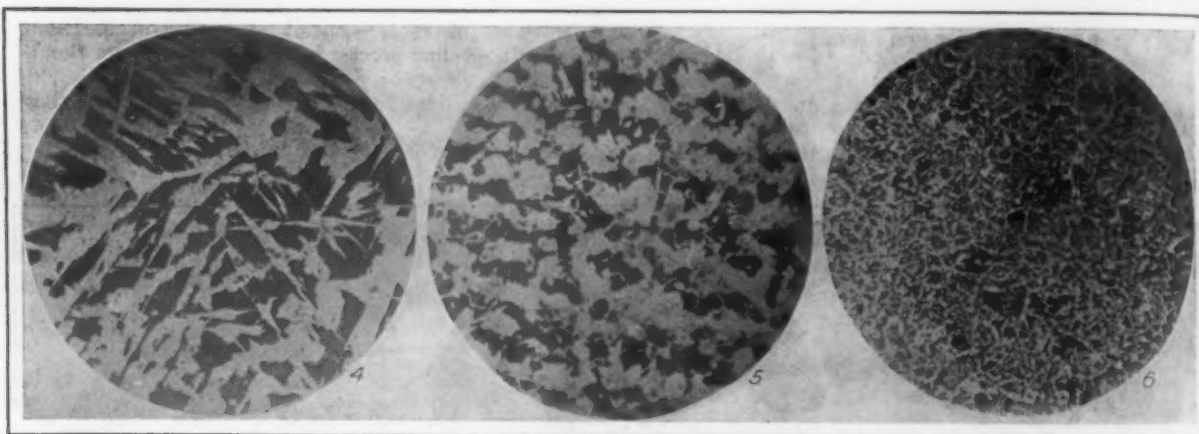
1. Slow annealing increases the tensile strength of the original steel.

2. Quick annealing materially raises the tensile strength over the slow annealing, with a corresponding increase in ductility.

3. In almost every case the elastic ratio is enhanced by either heat treatment, but more particularly by the quick cooling process, the exceptions being accounted for by other adequate causes.

The prevailing conception that annealing a steel casting "softens" the steel and so lowers its tensile strength is proved erroneous by these static tests and very many others. It is also established by many practical tests that repeated annealings, with slow-cooling, raise successively the tensile strength with a corresponding decrease in ductility—a fact little appreciated by the average foundryman. The following actual tests from slow cooling will illustrate this:

	Tensile str., lb.	Elas. limit, lb.	Elong. in 2 in. per cent	Reduction of area per cent	Fracture	Elas. ratio per cent
Unannealed..	70,000	36,000	22.0	30.9	½ cup	51.43
Annealed once	75,000	39,000	27.0	44.4	½ cup	52.00
Annealed three times	81,000	43,000	21.5	32.5	irreg.	53.08



Photomicrographs About Two-thirds Original Size Taken at 87 Diameters. No. 4, Unannealed Carbon Steel; No. 5, Same, Slow-cooled; No. 6, Same, Quick-cooled

attained is the production of the best static results then the quick-cooling method is the most effective. By far the best tests are obtained in almost every case where this method is used. This is best illustrated by actual results collected by the writer in his practical experience and shown in Tables 1, 2 and 3. Carbon, nickel and vanadium steel castings are compared. The tests were made on coupons of uniform size and conditions of pouring, so that the investigation could be as reliable and at the same time as practical as possible. The terms "green," "slow" and "quick" designate the three conditions of the steel, "green" representing the untreated and "slow" and "quick" the two treated conditions.

TABLE 1.—Carbon Steel

Test	Tensile str., lb.	Elas. limit, lb.	Elong. in 2 in. per cent	Reduction of area per cent	Fracture	Elas. ratio per cent
1 *Green	72,000	35,000	27.0	34.1	irreg.	48.61
2 †Slow	76,000	36,500	23.5	34.1	ang.	48.02
3 ‡Quick	81,500	42,500	23.5	34.1	ang.	52.16
4 Slow	72,500	36,500	27.0	34.1	irreg.	50.30
5 Quick	78,000	42,000	26.5	40.3	irreg.	53.84
6 Slow	69,500	36,000	30.0	43.4	½ cup	51.80
7 Quick	73,000	38,000	27.5	41.9	½ cup	52.00
8 Green	69,470	41,000	10.0	....	gran.	59.00
9 Slow	73,000	40,000	25.0	43.4	½ cup	54.80
10 Quick	77,000	44,500	25.5	38.8	½ cup	57.80
11 Green	78,000	38,000	24.0	37.5	½ gran.	48.73
12 Slow	80,370	41,380	24.0	37.2	irreg.	51.61
13 Quick	85,500	48,000	25.0	30.9	½ cup	56.10
14 Green	72,000	42,500	26.0	30.9	irreg.	59.0
15 Slow	75,300	40,610	26.15	42.3	½ cup	53.8
16 Quick	79,000	45,500	28.5	43.4	½ cup	57.6

*Fig. 4. †Fig. 5. ‡Fig. 6.

	Carbon per cent	Analyses—Manganese per cent	Silicon per cent
No. 1 steel	0.27	0.66	0.294
No. 4 steel	0.28	0.70	0.245
No. 6 steel	0.23	0.67	0.292
No. 8 steel	0.24	0.64	0.264
No. 11 steel	0.37	0.62	0.282
No. 14 steel	0.27	0.67	0.289

Nickel Steel Castings

The same marked improvement in the tensile strength and relative ductility is noted from the following tests in the case of nickel steel castings, but there does not seem to occur the decided change for the better in the elastic ratio, the maximum having been reached in the slow-cooling method; if anything there is a decrease in the ratio:

TABLE 2.—Nickel Steel

Test	Tensile str., lb.	Elas. limit, lb.	Elong. in 2 in. per cent	Reduction of area per cent	Fracture	Elas. ratio per cent
17 *Green	100,000	52,520	13.0	16.16	gran.	52.52
18 †Slow	101,010	63,630	19.5	41.00	½ cup	63.63
19 ‡Quick	107,000	67,000	20.5	37.20	½ cup	62.61
20	108,000	65,000	17.0	32.50	irreg.	60.20
21	106,000	66,000	18.0	34.10	irreg.	62.20
22 Slow	108,000	70,000	18.5	36.60	½ cup	64.80
23 Quick	114,200	65,900	15.0	25.82	angular	57.70
24	115,000	70,000	17.0	29.20	angular	60.80
25 Slow	99,000	67,000	21.5	45.4	½ cup	67.70
26 Quick	99,480	66,660	20.0	40.3	angular	67.08
27	101,000	60,000	19.5	30.9	angular	59.40

*Fig. 7. †Fig. 8. ‡Fig. 9.

	Carbon per cent	Analyses—Manganese per cent	Nickel per cent
No. 17 steel	0.35	0.70	3.30
No. 22 steel	0.34	0.70	3.42
No. 25 steel	0.30	0.65	3.55

Vanadium Steel Castings

A study of the table below shows that in the case of vanadium steel castings quite different conclusions are to be drawn from those noted for carbon steel and nickel steel castings:

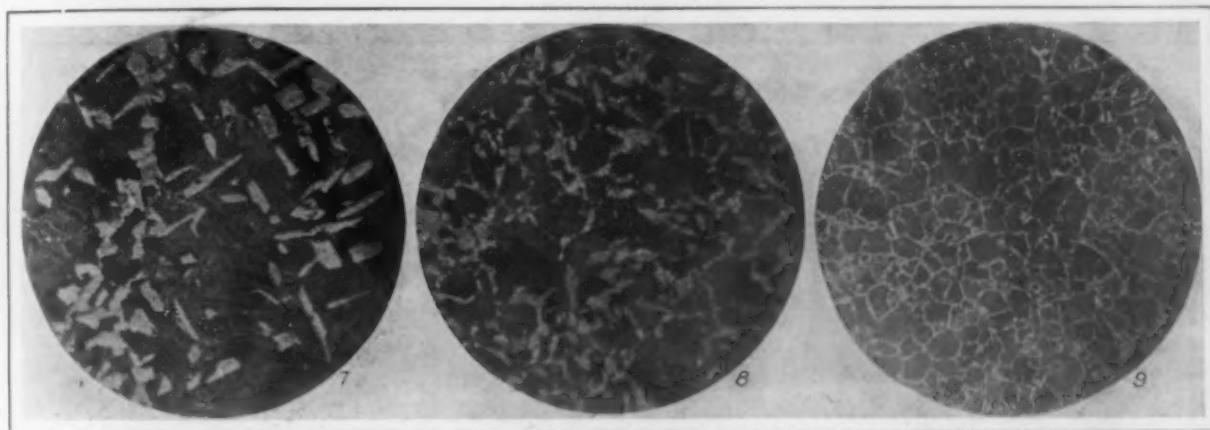
TABLE 3.—Vanadium Steel

Test	Tensile str., lb.	Elas. limit, lb.	Elong. in 2 in. per cent	Reduction of area per cent	Fracture	Elas. ratio per cent
28 *Green	84,500	39,000	18.5	25.8	½ gran.	44.07
29 †Slow	85,000	48,500	21.0	37.2	½ cup	57.05
30 ‡Quick	83,000	53,000	21.0	34.1	irreg.	63.85
31 Slow	78,125	45,625	21.62	32.65	irreg.	58.40
32 Quick	88,000	61,000	12.50	15.30	bad	69.31
33 Slow	71,250	44,500	28.50	46.35	½ cup	62.45
34 Quick	83,700	54,800	20.00	30.90	irreg.	65.47
35 Slow	74,625	44,375	24.00	37.60	irreg.	59.46
36 Quick	86,500	55,000	19.00	24.10	irreg.	63.58
37 Slow	70,250	45,000	27.25	41.80	½ cup	64.05
38 Quick	82,700	50,700	16.50	46.80	irreg.	61.30
39 Slow	70,500	44,000	28.75	46.80	½ cup	62.41
40 Quick	86,500	60,000	17.00	24.10	irreg.	69.36
41 Green	76,900	50,200	14.50	14.80	gran.	65.28
42 Slow	73,000	40,000	27.00	37.20	irreg.	54.80
43 Quick	81,000	50,500	15.00	20.60	irreg.	62.34

*Fig. 10. †Fig. 11. ‡Fig. 12.

	Carbon per cent	Manganese per cent	Vanadium per cent
No. 28 steel	0.26	0.66	0.208
No. 31 steel	0.22	0.59	0.181
No. 33 steel	0.22	0.61	0.172
No. 35 steel	0.23	0.69	0.164
No. 37 steel	0.24	0.60	0.170
No. 39 steel	0.21	0.57	0.168
No. 41 steel	0.26	0.49	0.183

The quick cooling of vanadium steel castings, carried out under the same conditions and at the same time with the carbon and nickel steels, produces:



Photomicrographs About Two-thirds Original Size Taken at 87 Diameters. No. 7, Unannealed Nickel Steel; No. 8, Same, Slow-Cooled; No. 9, Same, Quick-cooled

1. Large increase in tensile strength.
2. Decided increase in elastic ratio.
3. Surprising lessening of ductility.
4. Surprising decrease in reduced area.

As indicating the reliability of these important conclusions it should be stated that the tests were made co-ordinate with many of the carbon steel tests discussed in the foregoing, and also that a microscopical examination showed almost a perfect heat treatment and a microstructure even better than in the carbon tests.

Attention should also be called to the peculiar fact that vanadium steel castings possess a considerably higher tensile strength and brittleness in the green or natural state than carbon steel, nickel steel or any other description of steel casting. The necessity for careful and thorough heat treatment is all the greater in the case of vanadium.

The foregoing discussion with table should tend to establish the fact that if the end to be attained by annealing or heat treatment is the best physical results, the method of quick cooling or air tempering should be adopted—except in the case of vanadium steel castings.

Heating Before Annealing

At this point it is proper to mention briefly a matter that has been more or less discussed among metallurgists, with special reference to steel castings. It is claimed by some that the best physical results can only be obtained by heating the metal to a high temperature—about 2000 deg. F.—followed by sudden cooling and then by proper annealing. The object of this is to destroy the large crystalline structure, known as ingotism, which results from a slow cooling in the sand, this being more pronounced the greater the bulk of the metal. It also results from a high initial pouring temperature. In the case

of large castings, and also in general, such a procedure is not practicable, even if the results should warrant it. Static results from the ordinary methods of heat treatment are excellent enough for all practical purposes. An actual instance of the results of a trial of this pre-heating on test coupons of the same metal is given below:

	Tensile str., lb.	Elas. limit, lb.	Elong. in 2 in. per cent	Reduction of area per cent	Fracture	Elas. ratio per cent
Annealed by slow cooling	(1) 77,500	37,000	25.5	35.7	irreg.	47.71
	(2) 78,500	38,000	24.5	34.1	ang.	48.40
Pre-heated, cooled, then annealed as above	(1) 79,000	39,000	24.5	37.2	irreg.	49.36
	(2) 81,000	41,000	25.0	35.7	irreg.	50.61

In this particular case there is not a radical improvement in the results—not as much as would have followed treatment of the same metal by the quick-cooling process. The improvement is shown in the microstructure, the resulting crystals being smaller.

Metallographic Results

The metallographic aspects of this subject are interesting. The inevitable effect of the quick cooling of steel from just above the recalescence point is to produce a very fine, close microstructure, whereas the slow cooling causes a structure intermediate between this and the green state. In order to show this contrast in the

three types of steel castings under discussion photomicrographs of each grade are reproduced.

Figs. 4, 5 and 6 show respectively the green, slow-cooled and quick-cooled microstructure of ordinary carbon steel castings. These structures are those of tests 1, 2 and 3 respectively in Table 1.

Figs. 7, 8 and 9 represent the same respective conditions in the case of nickel steel castings, and are the structures of tests 17, 18 and 19 of Table 2. The radical difference in the structures is noticeable, due to the effect of the nickel which, by its solution in the ferrite, compresses these crystals.

In Figs. 10, 11 and 12 are shown the corresponding crystalline condition of vanadium steel castings. These structures are those respectively of tests 28, 29 and 30 of Table 3. Special attention should be called to the surprising structure of the green condition—a structure that is characteristic, as demonstrated by many samples examined by the writer. It strongly resembles the structure of ordinary carbon steel castings annealed by the slow-cooling process. This can be appreciated by a comparison with Fig. 5. The microstructure of the slowly-cooled specimen is also characteristic, differing decidedly from either of the other types. It will also be noticed that the microstructure resulting from the quick-cooling process is almost ideal, though the physical results are the contrary.

Annealing Temperatures

The question of the temperature at which steel castings should be heat treated is an important one. Theoretically there are definite limits, such as 1562 deg. F. to 1654 deg. F. for ordinary 0.20 per cent. to 0.30 per cent. carbon castings, and possibly other limits for nickel, vanadium, etc. But in actual practice it is found that

arbitrary figures cannot be followed. The size of the annealer, the location and type of pyrometer and other factors cause this. For instance, to insure satisfactory structures and fractures from all parts of an annealer of large dimensions, with a thermo-couple pyrometer located in a hole or holes in the walls, it is found necessary to cause the chart to register not less than 1700 deg. F. nor more than 1800 deg. F. With such practice inspectors have been presented with fractures and physical tests that have proved entirely acceptable.

An interesting phase of the effect of annealing temperatures on the physical results of steel castings is that caused by annealing at low temperatures or temperatures just under the recalescence point. By this is meant castings that may be subjected to a temperature around 1450 deg. F. to 1550 deg. F. from their particular location in the annealer or from the fact that the desired annealing temperature was not reached. This refers only to steel castings of moderate carbon contents, or up to 0.30 per cent. It has been found that many of the best physical results, as regards ductility in particular, have resulted from such conditions as are indicated by the accompanying static results:

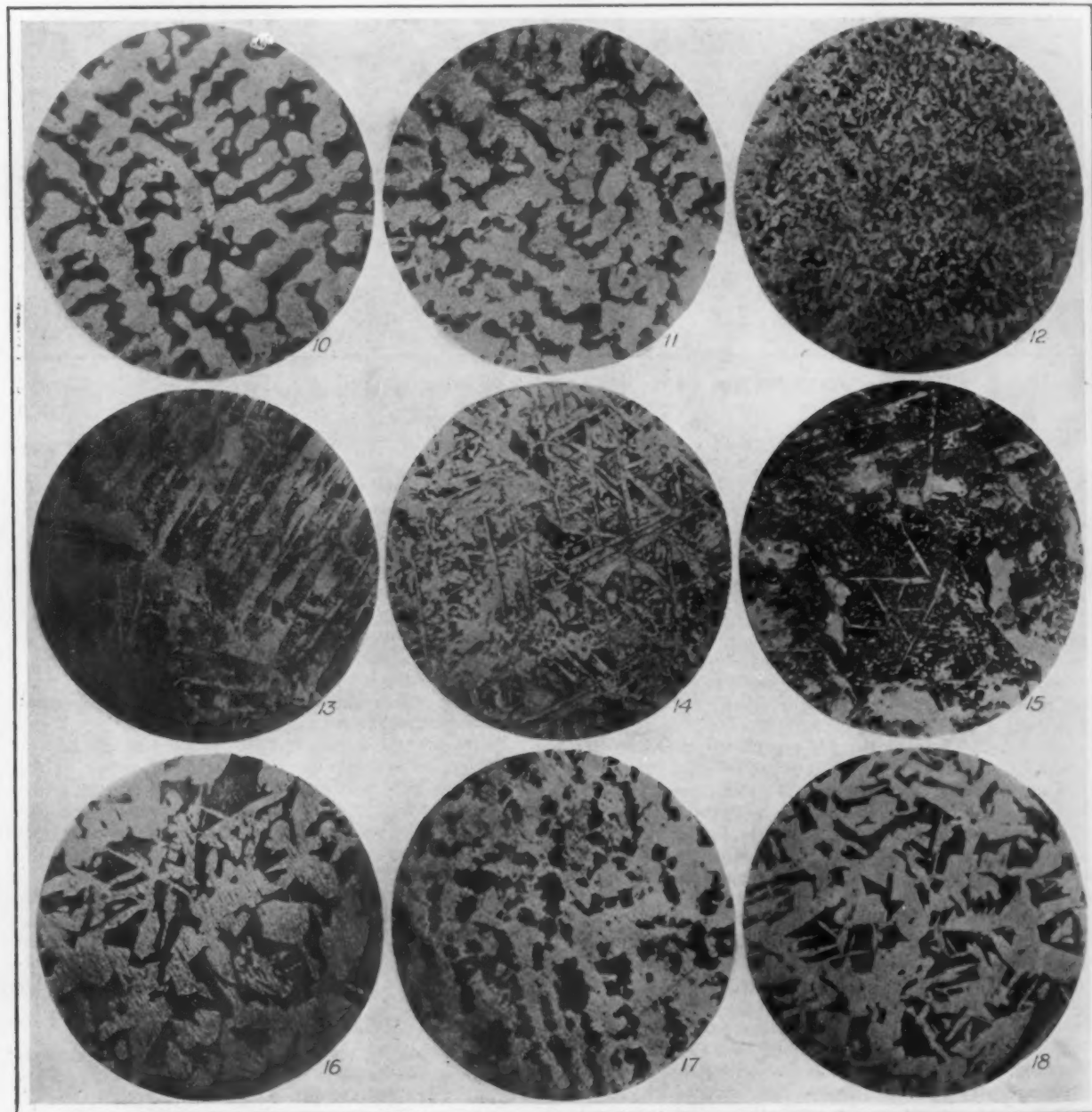
Tensile str., lb.	Elastic limit, lb.	Elong. in 2 in. per cent.	Reduction of area per cent.	Fracture
67,500	33,000	33.5	49.2	irregular, wavy
64,500	35,000	33.5	46.3	irregular, wavy
68,000	40,000	29.0	50.6	irregular, wavy

A striking characteristic of the fracture of such tests is that they all have a "wavy" or corrugated surface at the point of fracture—always a positive evidence of under-annealing. It will be found that such tests are lower in tensile strength than the same steel properly treated, though the ductility will be considerably better. This is due to the easy slipping of the crystals on each other.

The metallographic results of these thermal conditions present interesting phenomena, at least from a point of view of beauty. Under the microscope this under-heated medium carbon steel presents a beautiful and interesting structure showing the steel in its transition stage from the purely laminated to the cellular structure. In fact, it is possible to secure as many different and variegated views as there are possible points to observe. An inspection of Figs. 13, 14 and 15 will illustrate this fully.

These facts, however, do not apply to higher carbon steel nor to nickel or vanadium steel castings. Such under-heating in these cases results in very poor physical tests, which are often far inferior to those from an untreated condition. Therefore, the necessity for careful and thorough heat treatment of all grades of steel castings is imperative.

Of equal importance is the effect of too high temperatures in the annealing furnace. The results of this are a lessening of the ductility of the steel, especially if cooled quickly. Slow cooling from an excessive temperature tends to correct some of the bad effects, so far as static results



Photomicrographs About Two-thirds Original Size Taken at 87 Diameters. Nos. 10, 11 and 12, Vanadium Steel; Nos. 13, 14 and 15, Under-annealed Carbon Steel; Nos. 16, 17 and 18, Over-annealed Carbon Steel

are concerned; but the resulting crystals are large and angular. The accompanying physical tests will illustrate this:

Tensile str., lb.	Elastic limit, lb.	Elongation in 2 in. per cent.	Reduction of area per cent.	Fracture
74,000	44,000	21.0	42.8	irreg.
62,000	36,000	25.0	39.4	ang.
76,500	41,000	20.5	40.3	ang.

The corresponding crystalline structures of the above tests are shown respectively in Figs. 16, 17 and 18, none of which is a good safe structure. The first two are slow-cooling from a too high temperature and the last one, Fig. 18, shows the effect of quick cooling under the same conditions.

Tests with Larger Sections

This subject has thus far been discussed largely from facts based on experiments made with regulation test coupons, 8 x 3 x 1 in., annealed attached to or detached from the castings. So far as they go these are reliable and representative. But in order to test these facts on a larger scale the two methods of heat treatment were carried out on sections of steel of larger dimensions. Bars 5½ x 6½ in. x 6 ft. long and all of the same composition were used. One was used in the green or natural condition; another was annealed at about 1700 deg. F. by the slow-cooling process; a third was placed in the same locality in the same annealer, and after proper soaking it was removed into the air for quick cooling. Each of these bars was examined physically and microscopically as follows:

A section 8 in. long was cut from the best end of each bar and from each one of these sections thirteen physical tests were made and examined under the microscope. The object of this was to compare the effect of the three conditions of the same metal inside and outside the bar, physically and microscopically. Fig. 19 shows the original bar and the location of these various tests.

Physical Examination

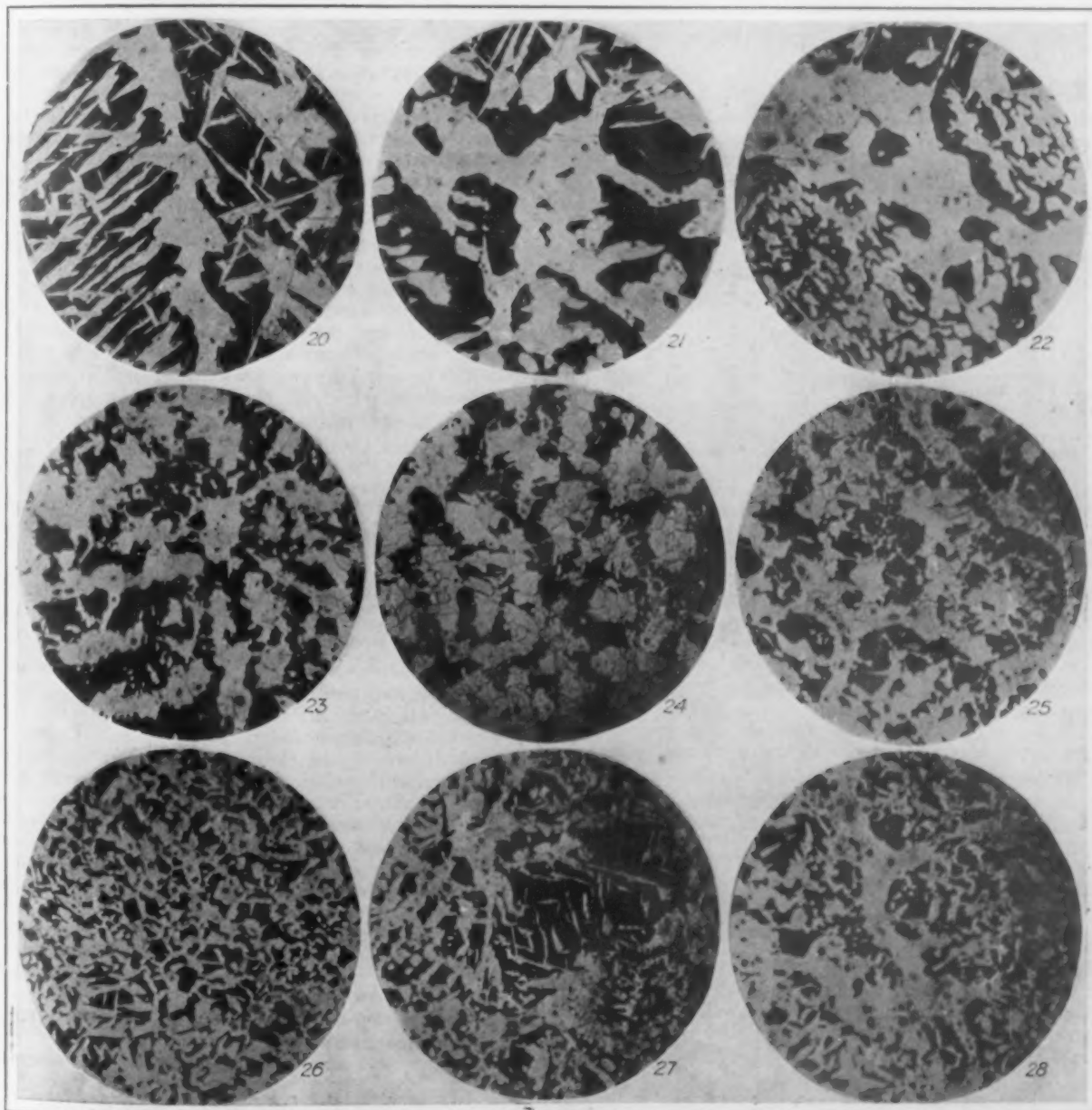
Green Section.—The results of the various tests on the section of the bar in the natural state are shown in Table 4. The numbers refer to the location in the large bar of each test.

TABLE 4

Test	Tensile str., lb.	Elastic limit, lb.	Elong. in 2 in. per cent.	Reduction of area per cent.	Fracture
1 * Drag, corner	74,000	42,500	17.5	29.2	½ gran.
2 Drag, center	74,500	43,000	15.5	15.3	gran.
3 Drag, corner	74,000	43,000	22.0	30.9	irreg.
4 Side, middle	73,500	41,000	14.5	17.0	gran.
5 Cope, corner	73,000	42,000	21.5	29.2	½ gran.
6 Cope, center	73,500	42,500	19.0	20.6	gran.
7 Cope, corner	74,500	42,500	21.5	24.1	gran.
8 Side, middle	75,000	42,000	17.0	18.8	gran.
9 † Center	76,000	42,500	9.5	11.5	gran.
10 Left center, drag..	72,500	42,500	15.0	15.3	gran.
11 ‡ Right center, cope	72,000	42,000	14.0	15.3	gran.
12 Right center, drag	71,500	41,500	16.0	18.8	gran.
13 Left center, cope..	71,000	42,000	13.5	17.0	gran.

*Fig. 20. †Fig. 21. ‡Fig. 22.

The extreme variations in the different parts of the green steel are illustrated here, the center ones being inferior, as is to be expected, owing to the fact that con-



Photomicrographs About Two-thirds Original Size Taken at 87 Diameters. Nos. 20, 21 and 22 Various Structures of Unannealed; Nos. 23, 24 and 25, Various Structures of Slow-cooled; Nos. 26, 27 and 28, Various Structures of Quick-cooled Carbon Bar

traction of the metal on cooling renders the interior of the larger sections of steel castings less dense.

Slow Annealing Section: The tests resulting from this examination are found in Table 5, the numerals having the same signification as previously.

TABLE 5

Test	Tensile str., lb.	Elastic limit, lb.	Elong. in 2 in. per cent.	Reduction of area per cent.	Fracture
1 *Drag, corner	74,000	41,000	26.0	40.3	irreg.
2 Drag, center	75,000	42,000	24.0	30.9	3/4 gr. flaw
3 Drag, corner	75,000	38,000	26.0	40.3	irreg.
4 Side, middle	74,500	41,500	24.0	30.9	irreg.
5 Cope, corner	75,000	40,500	26.5	43.4	irreg.
6 Cope, center	76,000	41,500	20.0	24.1	irreg.
7 Cope, corner	76,000	.....	24.0	40.3	1/2 cup
8 Side, middle	76,000	.....	21.0	29.2	irreg.
9 Center	57,000	.....	6.0	15.3	irreg., flaw
10 †Left center, drag.	75,000	.....	19.0	20.6	irreg.
11 †Right center, cope.	73,000	.....	16.0	22.4	ang.
12 ‡Right center, drag.	74,000	.....	16.5	18.8	3/4 gr., flaw
13 †Left center, cope.	73,000	.....	14.5	18.8	3/4 gr., flaw

*Fig. 23. †Fig. 24. ‡Fig. 25.

In the tests in Table 5 the general average is better than in those from the green section. The same difference obtains between the center and the other bars. The outside

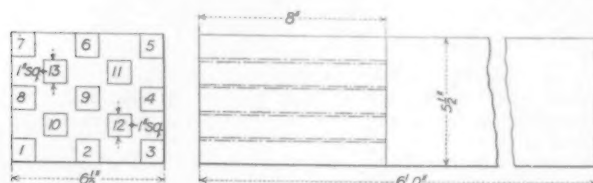


Fig. 19

portions, Nos. 1 to 8, show a uniformity that is very desirable. The general effect of the annealing has been to improve all sections, internal strains being removed, ductility improved, and tensile strength increased.

Quick Annealing Section: A static examination of this has resulted in the tests compiled in Table 6, the numerals referring to the same parts as in the two previous tables.

TABLE 6

Test	Tensile str., lb.	Elastic limit, lb.	Elong. in 2 in. per cent.	Reduction of area per cent.	Fracture
1 *Drag, corner	78,000	38,000	26.0	41.9	irreg.
2 Drag, center	77,000	42,500	23.5	32.5	irreg.
3 Drag, corner	79,500	50,000	24.0	41.9	1/2 cup
4 Side, middle	78,000	48,000	23.5	27.5	irreg.
5 Cope, corner	80,000	45,500	25.5	44.9	1/2 cup
6 Cope, center	78,000	43,000	23.5	35.7	irreg.
7 Cope, corner	55,000	47,500	Flawed bar	.....	.....
8 Side, middle	80,000	51,500	21.0	27.5	irreg.
9 †Center	77,000	52,000	15.5	20.6	poor
10 Left center, drag.	77,500	43,000	19.0	18.8	poor
11 †Right center, cope.	77,000	43,000	14.0	18.8	1/2 gran.
12 †Right center, drag.	79,000	48,000	16.5	18.8	gran., flaw
13 ‡Left center, cope.	78,000	44,000	11.0	18.8	irreg.

*Fig. 26. †Fig. 27. ‡Fig. 28.

The effect of this method of annealing is the same on a large section of metal as on test coupons, i.e., the tensile strength is appreciably increased and the elastic ratio considerably augmented without loss of ductility but rather with an increase. The outside bars, 1 to 8, are the best, and the inside ones show some improvement in their average over the corresponding ones of the other sections.

Of particular interest is the fact that in each case the corner bars are superior to the other outside bars.

Microscopical Examination

All of the 39 physical tests in the three foregoing tables were examined under the microscope, but only a few of them were photographed. A discussion of these follows:

Green Section: Figs. 20 and 21 reveal the microstructure of the outside and center of this section, the former being fairly uniform in its lattice formation and typical, and the latter being non-uniform. Fig. 22 shows the section near the center and here a still different structure is found, the presence of slag, oxides and manganese sulphide being clearly shown.

Slow Annealing Section: Figs. 23 and 24 show the crystalline structure of the outside and center of this condition of the same metal. The almost exact similarity of the two structures reveals how uniform is

the condition of the metal from this treatment; but more striking is the thoroughness of this method in that it shows that it is possible to permeate and transform completely large sections and remove all strains. Fig. 25 exhibits a portion of the metal near the center, illustrating how the presence of slag, oxide or manganese sulphide disarranges the best structures and renders weak a good heat treatment.

Quick Annealing Section: Figs. 26 and 27 show the crystalline condition of the outside and the center respectively of this section that has been quickly annealed. While the structure is similar to that obtained from test coupons, the resulting crystals are larger and by far much less uniform than those resulting from the other process of annealing. Such structures must insure a weakness in the metal that is never obtained from the other process unless the annealing has been imperfect. Fig. 28, located near the center, shows how the presence of slag, oxides and manganese sulphide distorts the crystalline arrangement and weakens the steel.

A chemical examination of a cross section of the green bar proved the absence of any appreciable segregation of the elements in a steel casting of this size. The analysis of this steel was as follows:

Carbon	0.27	per cent.
Manganese	0.67	per cent.
Silicon	0.289	per cent.
Sulphur	0.042	per cent.
Phosphorus	0.031	per cent.

This is the average composition of acid open-hearth steel castings.

The three sets of tests, discussed in the foregoing, reveal the physical and microscopical condition of each and show how uniform or non-uniform each is in certain parts.

In the green condition the non-uniformity is very marked, the presence of the large crystals affecting the static properties unfavorably and the strains therefrom causing weaknesses of marked intensity. They reveal the actual condition existing on the outside of any steel casting of moderate size. The larger the casting the more marked is this internal weakness, which emphasizes the importance of a proper heat treatment.

The effect of the slow-cooling process has been to remove all strains and render the whole metal as uniform as possible except where affected by variation in density or impurities. No heat treatment can rectify this. Physically this process has produced uniform static results and microscopically the metal has been transformed into a condition of almost regular crystallization even to the center, showing the removal of all strains.

The quick annealing process has produced a condition of static uniformity, with the increased beneficial characteristics of greater strength and ductility. But it is probable that this apparent uniformity is only partly reliable, for the crystalline condition is non-uniform and the presence of more or less internal strains is doubtless a fact because of the juxtaposition of large and small crystals.

Importance of Heat Treatment

The preceding presentation of the subject demonstrates how important is some heat treatment of steel castings. All castings should be annealed. This article is a plea for the slow-cooling process as best adapted to the general run of steel castings to produce a thoroughly reliable metal of enduring properties under all ordinary conditions. Superior static qualities, as evidenced by results from test coupons, are not the first consideration. For these sections of metal the quick-cooling method is safely applicable and an increased strength is obtained, but to so treat locomotive engine frames, wheel centers and other castings of varied thickness would result in a sacrifice of internal strength for better physical results, with the probability of ultimate failure of the castings in service. Other methods of heat treatment are under investigation, and one standard railroad is conducting extensive experiments on the heat treatment of its steel cast locomotive frames.

It is reported that large deposits of copper, coal and iron and manganese ores have been discovered about 150 miles from Calcutta, India, in the Dalthum district.

The Friedrich Changeable Open Hearth Port

The construction and use of the Friedrich changeable port, as developed at the Julienhütte in Germany, was described in detail in *The Iron Age* of August 25, 1910, p. 439; and some extremely good operating results were given in our issue of December 5, 1912, p. 1312. Engineer Friedrich gives still further results in an article in *Stahl und Eisen* for March 13, 1913. By the use of these ports in the methods described in the preceding articles the repair costs at the Julienhütte have been reduced by about 40 per cent. In 1910 they were only 24.7c (1.04m); in 1911, 27.8c (1.17m); and from January to July, 1912, 25.4c (1.07m) per metric ton of good ingots.

There were 384 working days from August 1, 1911, to October 31, 1912, during which time the plant was run as full as possible. There are six 40 to 45-ton furnaces and one 150-ton mixer at the Julienhütte, and the pig iron-ore process is used almost exclusively. It should be borne in mind that no open-hearth plant can be run in Germany on Sunday, and that the Friedrich port can be installed in from 4 to 6 hr. on Sunday morning, the furnace being ready again on Monday. During these 384 days, which equal $384 \times 6 = 2304$ furnace days, there were four days on which only four furnaces were working, 187 days on which five were working, and 193 on which all six were in operation. This gives a total of 2109 furnace days, so that during this long period of 15 months only 8.46 per cent. of the total furnace days were needed for repairs. In other words, the plant was used on the average to 91½ per cent. of its capacity. The previous articles gave the remarkable steady and high daily tonnage outputs per furnace up to June 15, 1912, and these results were maintained up to October 31, 1912.

The economic importance of these results is clear. While with the old construction a six-furnace plant is necessary to insure four furnaces being constantly at work and five furnaces part of the time, the Julienhütte plant during four-fifths of the year works more days with six than with five furnaces. While it is usually estimated that a furnace will operate 250 out of the 300 working days in the year, it is seen from the results above that at the Julienhütte a furnace is in operation for 274.6 days; that is, 10 per cent. more. This means a 10 per cent. increased output, or that in designing new plants where the amount of output desired is limited for any reason, one or more furnaces, with all the accompanying buildings, machinery, etc., can be spared if the changeable port is used.

The British Shipbuilding Trade

Lloyd's Register, issued in April, indicates 94,000 tons more merchant shipping in course of construction in the various yards in the United Kingdom than was the case three months ago. The promise of the future, however, is somewhat in doubt. With recent advance in wages in the shipbuilding yards and the increased cost of materials, the prices quoted by builders for new shipping have had to be greatly increased. A contributive cause of high costs also mentioned is increased charges due to recent legislation. There is accordingly much more hesitancy in placing orders, and Engineering of London says that feeling in shipping circles is that until the prices become steadier there will not be many new ships put into construction. The increase shown in Lloyd's returns is due to the bringing into evidence of work which was placed some time ago at more favorable terms than are now quoted.

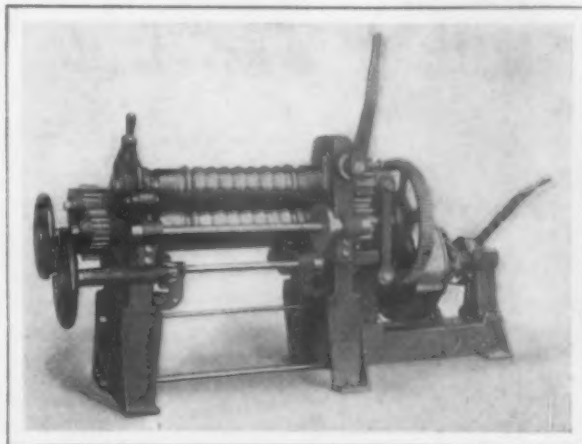
The work in hand on March 31 was as follows: Merchant ships, 2,063,694 tons; warships in dock yards, 132,190 tons; home warships in private yards, 273,421 tons; foreign warships, 150,700 tons; total, 2,620,005 tons. The aggregate is 153,065 tons more than it was three months ago and 278,638 tons more than six months ago.

The New Zealand Government has taken up the question of the establishment of an iron and steel plant to work up iron ore deposits at Parapara and Omakaka. The proposals of a London syndicate were considered unsatisfactory by the committee representing the House of Representatives of New Zealand and the advisability of the government developing the industry as a state enterprise is being considered.

A Metal Culvert Curving and Forming Machine

The Niagara Machine & Tool Works, 639 Northland avenue, Buffalo, N. Y., has recently brought out a forming and curving machine for corrugated metal. The machine will handle work as heavy as No. 10 gauge standard galvanized sheets for the manufacture of culverts, sewers, etc., and will not only curve the sheet to the proper form, but will also re-shape the ends at the same time to make the different sections interlocking. Herewith is a view of the machine.

High-carbon steel forgings are employed for the rolls,



A New Curving and Forming Machine for Corrugated Material

which are made in one piece, with the exception of the forming collars on the ends, which are removable. The two front rolls, as well as the rear one, are all driven. The pinions and connecting gears are made of steel, with teeth cut from the solid. The position of the lower front end of the rear roll can be varied vertically by a hand-wheel at the left side of the machine, while the upper front roll can be raised by a lever on the right side to remove the formed cylinders. The machine is double back geared and the motion is controlled by a hand lever operating a friction clutch. The external diameter of the rolls is 7½ in. and the weight of the machine is 4500 lb.

The Baltimore Advertising Convention

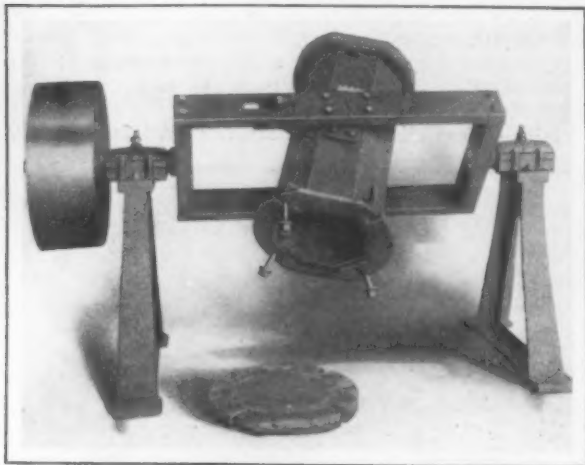
The Associated Advertising Clubs of America will hold an international convention of advertising men and business men interested in the extension of trade through publicity in Baltimore, Md., the week of June 8 to 13. This will be the ninth annual convention of a body which has affiliations in Canada and England and desires to extend its connection to all countries in the world. It will be attended by delegates and business men, including importers and exporters, from all parts of this continent and from many European countries. The indications are that the attendance will approximate 10,000. It will be the first world-wide convention in the interest of advertising ever held. A special invitation to attend has been extended by the Department of State of this country, through our consular offices, to advertising clubs, commercial bodies, publications and business concerns and agencies throughout the world.

The Advertising Club of Baltimore, whose executive offices are at 1 North Calvert street, has for some time been actively engaged in the work of creating interest in the convention. President Edward J. Shay of this club some time ago appointed a press and publicity committee, comprising representatives of Baltimore publications and business interests, which has been doing excellent work in spreading news with regard to the development of preparations for taking care of the convention. The chairman of this committee is Alfred I. Hart, editor of the Old Bay Line Magazine.

Another record in the production of large ingots has been recently established by Cammell, Laird & Co., Ltd., Sheffield, England. The ingot, which was intended for special Admiralty requirements, weighed 150 tons. Its length was 23½ ft. and it measured 80 in. across the flats at the large end.

New Oscillating Steel Ball Burnishing Barrel

For burnishing metal pieces longer than 16 in., the Abbott Ball Company, Hartford, Conn., has brought out a new type of burnishing barrel. It is designated by the



A New Type of Oscillating Burnishing Barrel in Which Steel Balls Are Used

builder as its oscillating barrel and can be filled almost entirely with the pieces to be finished, the steel balls for doing the work, the soap chips and water being added as usual. It is pointed out that by the method of filling, the work has no chance to turn on end or move in the barrel as it would in one having a smaller diameter and only partially filled. The builder states that small work, running up to a few inches, can be finished more satisfactorily in its regular burnishing barrels, one of which was illustrated in *The Iron Age*, February 29, 1912. The reason for bringing out the new type of barrel was to allow pieces, such as sash rods, etc., to be finished by the burnishing process.

As will be noticed from the accompanying illustration, the barrel itself is held in trunnions in a yoke, the sides of which are made of channel irons. The barrel can be locked at an angle with the sides of the yoke by a cast-iron locking piece sliding in the yoke and having mechan-

ism for fastening it in the desired position. The barrel is locked in a straight horizontal position by the engagement of a lug which is cast on the side of the barrel proper, with a slot in the sliding lock member. It is also possible to lock the barrel at angles of 5, 10 or 15 deg. with the yoke, the locking being accomplished by the engagement of teeth in the opposite end of the sliding lock with corresponding teeth in the outside end of the trunnion bearing on the barrel. The possibility of locking the barrel at different angles for running, it is pointed out, gives more or less of an oscillating motion to the contents, the angle in any particular case being determined by the character of the work to be finished.

When the locking mechanism is disengaged, the barrel can be swung in an upright position to load and can be turned over on the main bearing for dumping the contents, as shown. The barrel is octagonal in shape and the inside dimensions are 12 x 30 in., the latter being the length. It is lined with hard maple and opens at one end by loosening four nuts on swing bolts, as indicated.

Rehabilitation of a Flooded Foundry

Quick Rising from Ohio Floods
of the Niles Tool Works

The floods in the Central West are now a matter of history, except with those manufacturing concerns that were most affected. However, the work of cleaning up and getting plants into operation was accomplished in a wonderfully short space of time.

In the case of the Niles Tool Works Company's machine shop, at Hamilton, Ohio, water over 12 ft. in depth passed through the shop, leaving behind several inches of mud. While the company was handicapped on account of a shortage of labor, work was commenced immediately to get everything into shape and within two weeks' time Superintendent Siebold had part of the shop in operation. This is especially quick action, when the damage to the central power plant is taken into consideration.

The large foundry building, situated across the street, but on lower ground, had more than 15 ft. depth of water, with the resultant damage from deposits of mud and debris of all kinds. Fig. 1 shows the foundry the day after the flood, and Fig. 2 indicates the quick results ac-



Fig. 1—Main Bay of the Niles Tool Works Foundry Immediately After the 15 Ft. of Water Subsided

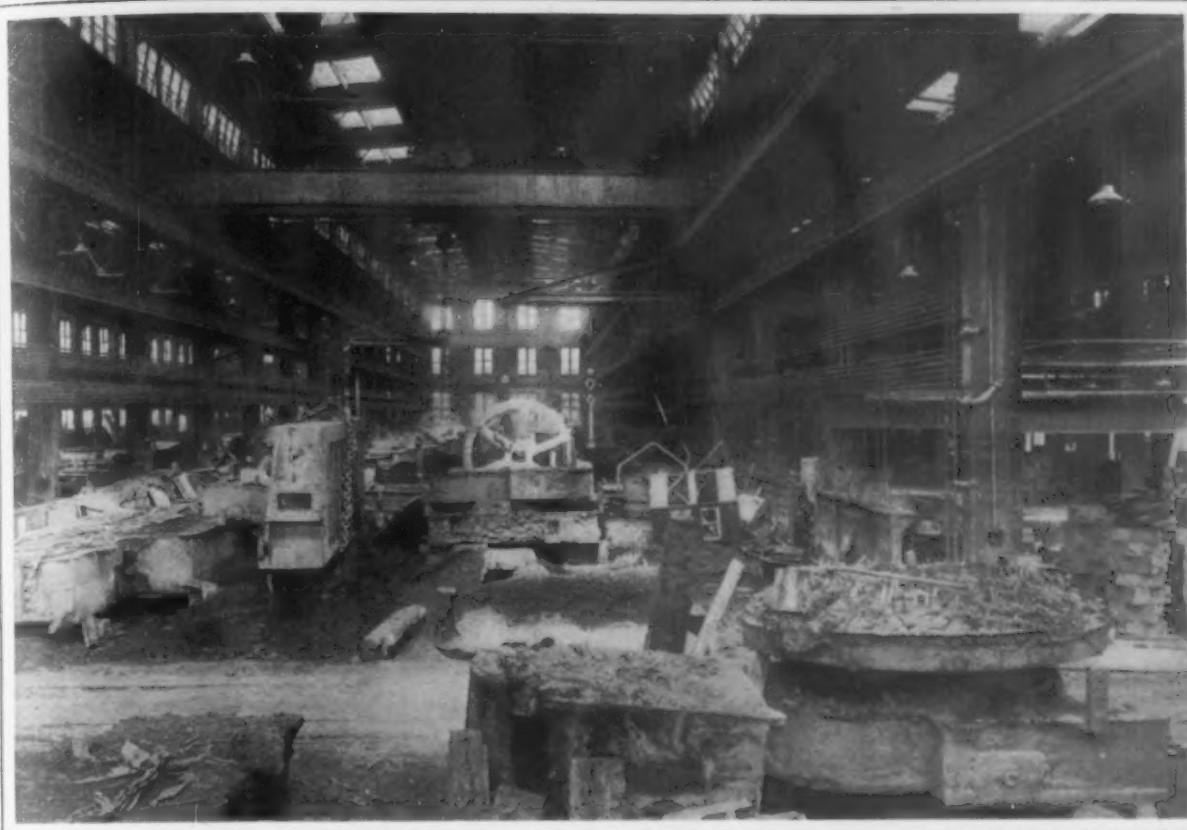


Fig. 2—Main Bay of the Niles Tool Works Foundry, Showing the Result of Five Days' Cleaning-Up Operations

completed under direction of Foundry Superintendent Boden in five days' cleaning-up work. Both the machine shop and foundry were operating up to 60 per cent. of normal on April 15.

To President James K. Cullen belongs the credit for initiating the plan which was adopted by other manufacturers of paying skilled labor full time when engaged in cleaning up work. Although many men were not able to take advantage of this offer, as they were engaged in straightening out their own homes, the idea had a stimulating effect on those who were able to work outside, and to a large degree is responsible for the results accomplished.

A Water Power Head of 5412 Feet

The utilization of a water power head of 5000 ft. has been considered impracticable in technical circles. M. Boucher, civil engineer, Lausanne, after whose plans many water power projects with a comparatively high head have been developed, has made it his aim, as a member of the board of administration of the Société d'Electro-Chimie of Paris to convert into electric energy the water power of Lake Fully, near Martigny, in Canton Wallis, Switzerland, with a head higher than has hitherto been used, namely, 5412 ft. The execution of this scheme has been resolved upon, the orders for the necessary materials placed and the work has been commenced.

The most interesting question in connection with this development arose when deciding in what manner the pipe line should be constructed to withstand a pressure of 2425 lb. per sq. in. at the lower end. A satisfactory as well as simple solution was found. The pipe line, having a length of about $2\frac{3}{4}$ miles, consists of pipes with inside diameters of 19 $\frac{11}{16}$ in. and 23 $\frac{5}{8}$ in. and thicknesses of $\frac{15}{64}$ in. to 1 $\frac{25}{32}$ in. The pipes of the upper section will be of the usual lapwelded type and those of the lower part will be seamless. The seamless pipes, which are drawn from a steel ingot, can be made up to the largest diameters.

The turbines for 15,000 hp. will be built by Piccard, Pictet & Co., Geneva, Switzerland, while the construction of the pipe line is in the hands of Thyssen & Co., who possess at Muelheim-Ruhr, Germany, extensive steel, plate and tube works as well as a water gas welding plant for large pipes. At Thyssen & Co.'s works a great many pipe lines for water power plants have been constructed.

A Large Size of Crank-Operated Arbor Press

A new and larger size has been added to the Greenerd line of arbor presses by the builder, Edwin E. Bartlett, Boston, Mass. In the design of this press, which will handle work up to a maximum diameter of 36 in., no changes have been made, either in principle or design, from the largest press of this type previously built, which was illustrated in *The Iron Age*, July 4, 1912, except in size and power.

The leverage of the new press is 250 to 1 and a pressure of 25 tons, it is stated, is thus easily obtainable.

When the lever is in the position shown in the accompanying engraving, the rack or ram can be easily moved up or down by the hand-wheel. The knee is operated by a crank, as shown, which revolves a screw by a pair of mitre gears. This screw runs in a nut in the base, and the design is such that the knee can be lowered to its extreme position without the screw reaching the floor, thus making it



The New No. 7 Greenerd Arbor Press, Capable of Exerting a Pressure of 25 Tons

possible to place the press in any position without cutting the floor for the screw. The knee is fastened to the frame by two studs and nuts, which are adjusted and locked so that the knee can be easily moved. The pitch of the elevating screw is such that these nuts do not require tightening to hold the knee under the heaviest pressure.

Three Years of Accident Prevention

Results of Efforts to Eliminate Accidents to Employees by the Eastman Kodak Company—Some of the Safeguards in Operation

The statistics presented herewith show the successful results obtained by the continuous campaign waged to prevent accidents to employees in the five factories of the Eastman Kodak Company in Rochester, N. Y. The experience is a strong justification of the works' committee of safety, to which reference was made in *The Iron Age* October 24, 1912. Also reproduced are illustrations of several of the devices to which attention had not previously been given, used in accident prevention in the factories of the company. As will be seen from the table giving the number of accidents occurring in each of the five factories in the years 1910, 1911 and 1912, their number has been cut down materially when the greatly increased number of workers is taken into consideration, there having been 1823 more employees in 1912 than in 1910. In 1910 with the approximate number of employees, 3755, the number of accident cases per 1000 was 109.72, while with 4311 employees in 1911, it was 71.67 per 1000 and in 1912 with 5578 employees the rate was 61.13 per 1000. Of course, in a large number of the mishaps classed as accidents only injuries of a minor nature were received and many of these it is impossible for any save the employees themselves to guard against effectually and even then, despite all caution, they sometimes happen. Most certain it is that many, if not a majority of these incidents would have been attended with serious results were it not for their being minimized by prevention measures. The work has been progressive with better and more devices installed year by year. While the total of accidents was numerically greater in 1912 than in 1911, it really was less in proportion to the larger number of employees, as indicated in the following comparative table, which also shows the relative numbers of accidents in each of five factories in the years 1910, 1911 and 1912:

Works' Accident Statistics for Three Years				
	Average number of employees	Number of near accidents	Number of accidents	Total accident cases
1910				
Factory A	956	67	53	120
Factory B	232	7	9	16
Factory C	167	3	6	9
Factory D	2161	103	133	236
Factory E	239	20	11	31
Total for 1910..	3755	200	212	412
Number of cases per 1000 employees.....				109.72
1911				
Factory A	1144	8	52	60
Factory B	278	4	9	13
Factory C	170	6	6	12
Factory D	2421	60	121	181
Factory E	298	27	16	43
Total for 1911..	4311	105	204	309
Number of cases per 1000 employees.....				71.67
1912				
Factory A	1600	10	47	57
Factory B	258	5	7	12
Factory C	136	6	10	16
Factory D	3218	57	149	206
Factory E	366	31	19	50
Total for 1912..	5578	109	232	341
Number of cases per 1000 employees.....				61.13

The Eastman Company has had lantern slides made of the various safety devices it uses and is now completing a roll of moving picture films showing the more intricate and novel devices in operation. Both slides and motion pictures are to be used for educational purposes, first for the company's own employees and then for the other manufacturing interests of Rochester. The privilege of using the films has already been requested by the committee for the prevention of accidents of the National Association of Manufacturers.

In Fig. 1 is shown the exhaust system from a group



Fig. 1—Buffing Department, Showing Exhaust System

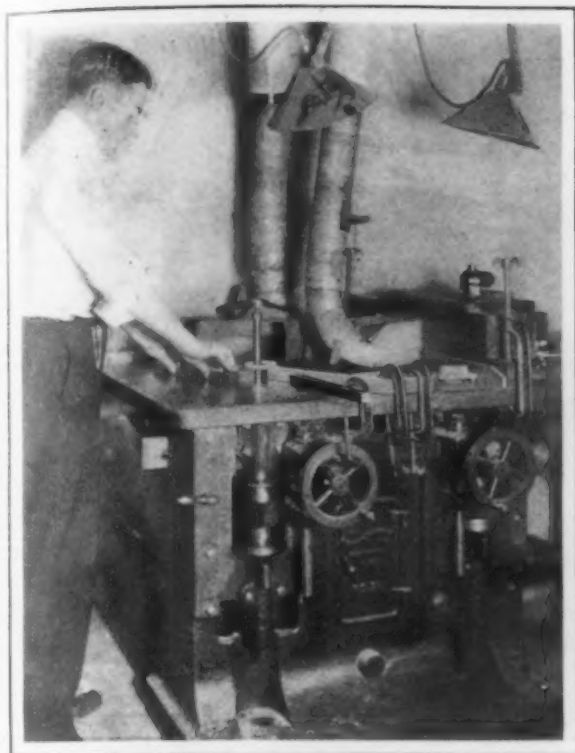


Fig. 2—Safety Guard for Small Groove Saw on Shaper Consisting of Metal Disk on a Flat Wire Spring with Center Opening Larger than the Spindle



Fig. 3—Safety Guard on Wood Shaper for Form Work. It also Acts as a Shaving Conductor

of about six double-ended motor-driven polishing lathes. The system is designed to catch as large a percentage of the dirt as possible and was made deep enough so that the dissolved Tripoli and other compounds have a chance to cool before striking the bottom of the hood and in this way a great deal of it is sucked up by the exhaust system which otherwise would block the pipes.

Fig. 2 shows a spring gauge on a shaper spindle, protecting a small cutter used for rounding the edge of work.

The spring has a large hole through which the spindle projects and the periphery of this ring is a little larger than the diameter of the cutter. As the work is pressed up against it, it recedes, permitting the cutter to do its work and when the work is accomplished it springs back covering the teeth of the saw.

A shaper guard protecting two saws about 6 in. in diameter on shaper spindles is shown in Fig. 3. The work that is grooved and sized is placed in a form, but owing

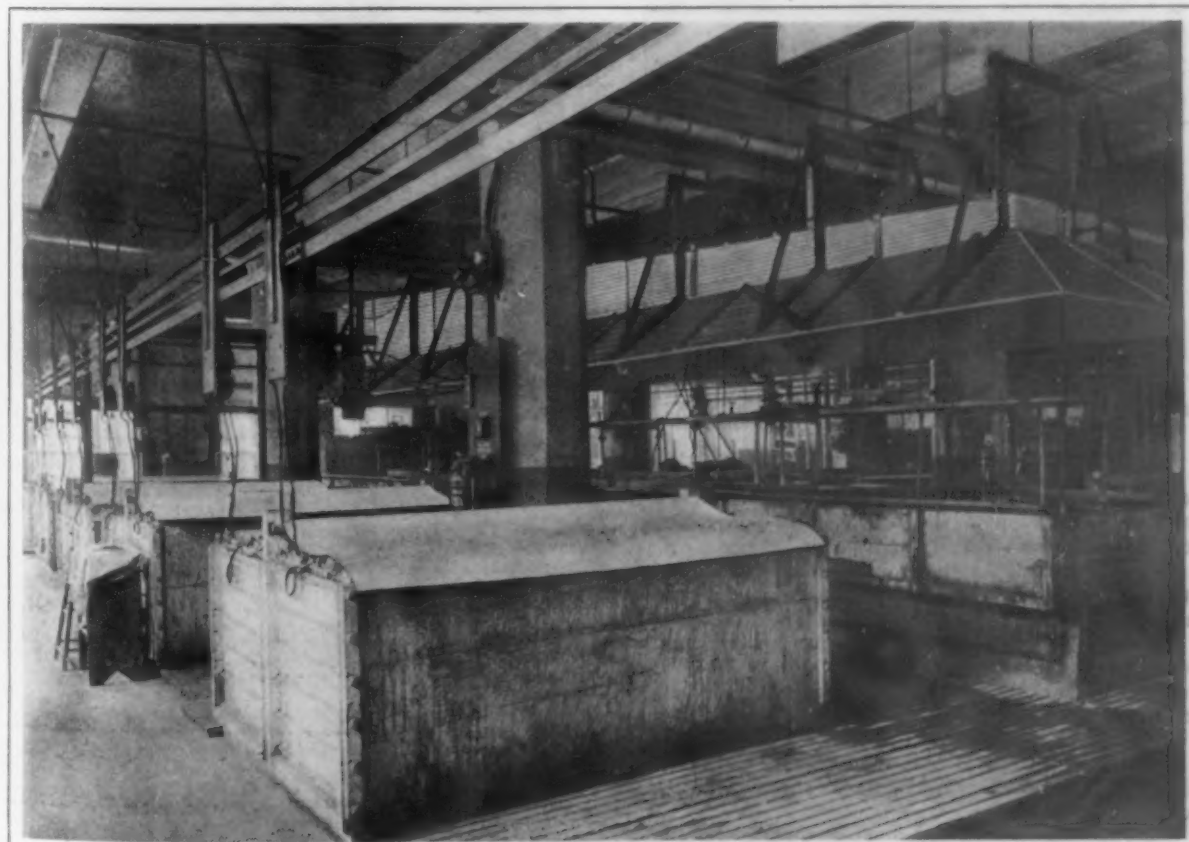


Fig. 4—Nickel Plating Department Showing Exhaust System for Acid Fumes and Steam; also Showing Method of Covering Tanks

to the nature of the work it is a hard proposition to guard. This was accomplished by swinging two gates in front of the saw, which recede when the form is shoved in to make a cut and swings back into position covering the groovers and preventing the operator from coming in contact with the saws.

The Eastman Company's method of exhausting fumes from its electroplating room is shown in Fig. 4, the photograph also illustrating covers for drawing over the plating tanks to protect them from dust, dirt and oxidization. Fig. 5 illustrates a clicking machine manufactured by the United Shoe Machinery Company for cutting leather. A hollow die about $\frac{7}{8}$ in. in height is used. Before the machine had been in use two weeks in an Eastman factory one of the operators caught his thumb between the platen and edge of the die. To obviate any recurrence there was placed in position, as shown in the cut, a brass guard rail projecting about $1\frac{1}{4}$ in. from the edge of the platen and supported by flat springs, so in swinging platen over the work this brass rail would warn the operator before the platen could reach his fingers.

A camera bellows press operated by compressed air is shown in Fig. 5. The male part of the die operates from the bottom upwards. It is necessary for the operator to lay a piece of paper on this die which is punched into strips by the operation of the punch. It is possible to place a strip with one hand and operate the lever which turns



Fig. 7—Saw Guard with Wire Sides Protecting the Saw, but Making Work Visible

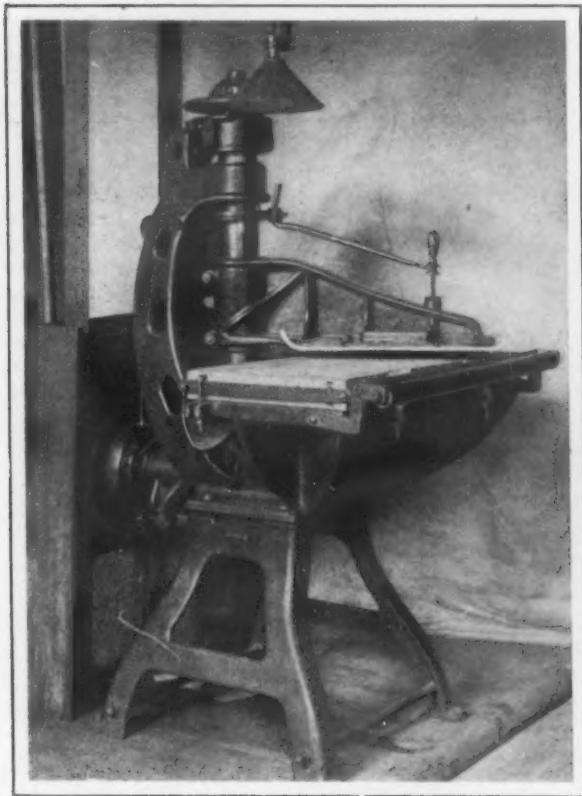


Fig. 5—Safety Guard on Clicking Machine to Prevent Fingers Getting Under the Platen When Lever is Released

on the air with the other. In this way an operator has been caught, but since the accident a safety apron has been placed on the bottom of the valve. This apron brushes the hand back from the die and makes it impossible for an injury to occur. In Fig. 7 is illustrated a saw guard very similar to one described in the previous article on the Eastman precautions for safety. In this device both sides of the guard are made of wire netting, making the saw visible to the operator at all times.

The frequency of accidents in the various hours of the day, as shown by records kept in the Eastman factories, is indicated in Fig. 8.

In an accompanying table is shown a distribution of accidents among the five factories in the three years named, according to causes.

Other devices used by the company include a new type of saw guard, which has the advantage of not being suspended from the ceiling, and being easily adjustable and in

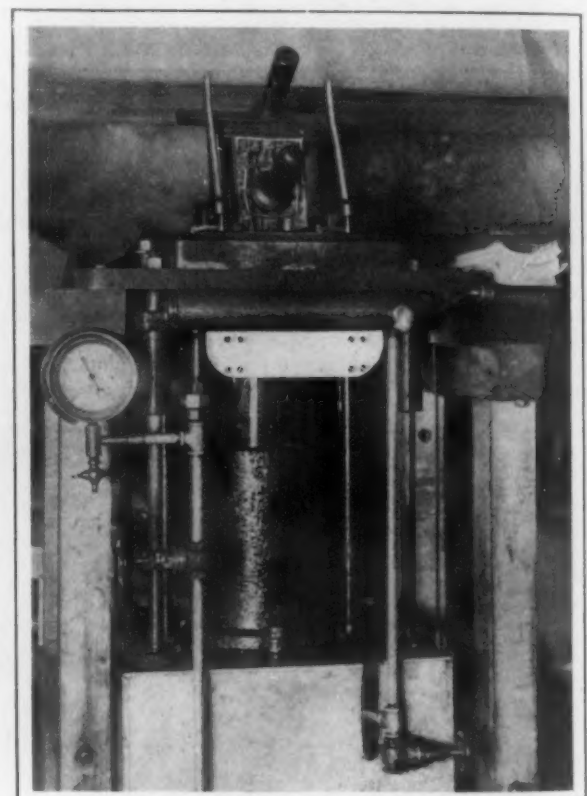


Fig. 6—Camera Bellows Machine with Safety Guard in Operating Position; Operating Lever Up

Causes of Accidents Over Three Years

	1910	1911	1912	3 yrs.
Fingers and hands, between punch press and shears	54	40	24	118
Fingers and hands, against woodworking saws	18	19	15	52
Fingers and hands, into woodworking cutters	8	10	7	25
Bruises, burns and lacerations of minor importance	168	144	156	468
Falling off ladders, platforms and slipping... ..	41	27	36	104
Injured around elevators	3	6	4	13
Injured around emery and other grinding wheels	13	5	9	27
Obstructions in passageways and doors.....	2	2	7	11
Falling tools, material, etc.....	36	32	26	94
Fingers and hands, under drilling and boring machines	32	8	19	59
Fingers and hands, into automatic screw machines	4	3	5	12
Injured around lathes and milling machines..	18	2	4	24
Stepping on nails	15	11	17	43
Injured on machines of special nature.....	..	..	12	12
Totals	412	309	341	1062

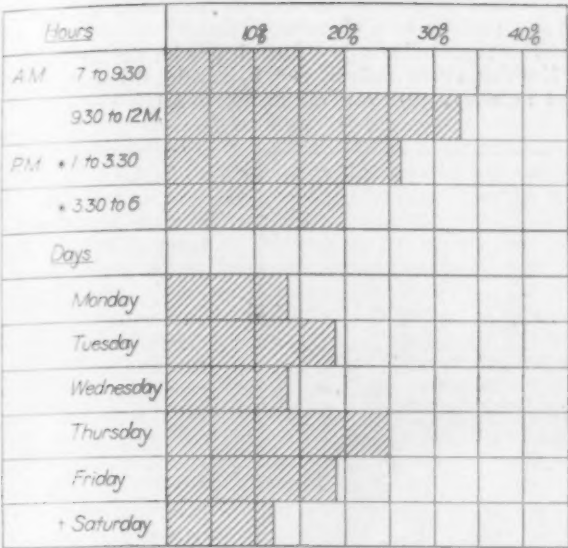


Fig. 8—Frequency of Accidents According to Days and Hours, Record Covering Period of 8 Months. No Accidents on Saturdays for Periods Marked, as a Half Holiday is Given that Day

full control of the operator. A handle on the right side is provided with a saw toothed rack which holds the guard at proper elevation. Another device is a simple method of guarding a saw table when the latter is tipped at an angle of 45 deg. A projecting wooden guard is fitted with a loose steel plate between the saw and the operator which drops down on the saw table between saw and operator as he shoves the work under the guard. The printing presses used by the company are protected by several efficient devices. In the case of a Colt's armory press the operating levers are covered by guards, a provision which was found necessary because several operators had been caught in absentmindedly reaching under the platen for the operating handle which puts the inking arrangement into operation. Another safeguard is for an ordinary platen printing press. It is attached to the operating arms so that as the platen starts on its upward motion the guard rises about 8 in., catches the operator on the wrist or forearm and draws his hand from between the platens before they reached their closed position. Around the flywheel of a Gordon printing press is placed a rail and guard which prevents the operator from coming in contact with the mechanism of the machine or anything being forced or falling against the flywheel, thereby creating damage.

Lathe for Turning Heavy Steel Rolls

For use in steel foundries and roll shops, where the greater part of the work is the turning of large steel rolls and pinions, the A. Garrison Foundry Company, Pittsburgh, has brought out a heavy duty lathe. The special features of the tool are the absence of overhung gears, ability to lift out any shaft without disturbing the others, and the location of the main pinion so that the pressure exerted is downward and not against the cap.

The bed is of the double box type reinforced by ribbing. In the design of this lathe all the shafts were

arranged so that any one can be lifted out without disturbing the others, and all the gears are between the two headstock bearings, thus eliminating overhanging parts. The driving gear for the face plate pinion, which is of heavy construction, is located next to the front bearing, an arrangement which, it is pointed out, eliminates any spring in the shaft. The location of the main pinion is such that the pressure exerted is in a downward direction and not against the cap. A plate-iron gear guard, which is not shown in the engraving, covers all of the gear wheels, but it is possible to remove this easily when the necessity arises.

The following table gives the principal dimensions and specifications of the lathe:

Length of bed, feet	30
Breadth, feet	5 1/2
Depth, inches	21
Maximum distance between centers, feet	21
Swing over bed, inches	62
Swing over necking rest, inches	50
Pitch diameter of face plate, inches	61-1/16

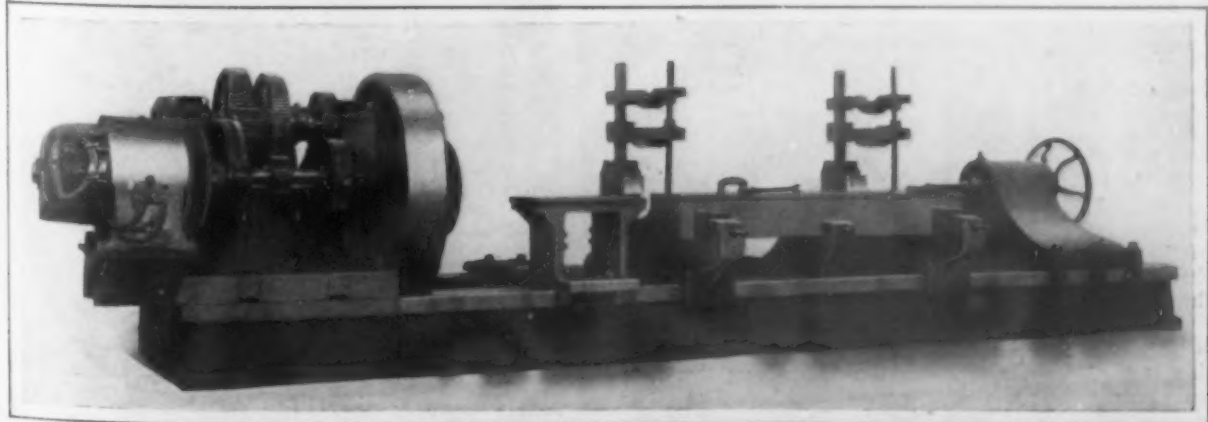
The lathe is motor driven, the power being supplied by any standard electric motor having a continuous rating of 30 to 40 hp. There are five gear reductions between the motor and the face plate, the ratio of reduction not including the motor gears being 1 to 220. The speed of the motor ranges from 550 to 1100 r.p.m., but other ratios can be provided to suit the customer's requirements.

Lake Steamship Merger

A merger of a large number of Lake ore boat interests, for which negotiations have been under way for some time, has been effected by the Lackawanna Steamship Company. At a meeting of the stockholders of that company, held in Cleveland, Ohio, April 25, the purchase of 32 vessels was ratified, giving the company a fleet of 39 ships. The fleet, which includes 37 steamers and two barges, will be the largest one on the Great Lakes with the exception of that of the Pittsburgh Steamship Company. The boats will be handled in the offices of Pickands, Mather & Co.

The name of the Lackawanna Steamship Company was changed to the Interlake Steamship Company, and its capital stock was increased from \$1,250,000 to \$6,500,000. The following officers were elected: H. G. Dalton, president; H. S. Pickands, vice-president; E. P. Williams, secretary and treasurer; C. C. Canfield, assistant secretary and treasurer; S. E. Bool, auditor. The directors are Samuel Mather, H. G. Dalton, H. S. Pickands, H. P. McIntosh, A. T. Kinney and James H. Hoyt of Cleveland and Moses Taylor of New York. The boats that are taken in the merger include 17 steamers of the Gilchrist Transportation Company and 15 boats of the Mesaba Steamship Company, Interlake Company, Huron Barge Company, Provident Steamship Company, Acme Steamship Company and Standard Steamship Company.

The passenger traffic department of the Chicago, Milwaukee & St. Paul Railway Company, Chicago, has issued a booklet entitled "New Towns and Business Opportunities." Five pages are devoted to an alphabetical list of lines of business for which opportunities are presented in the territory served by the company and this is followed by 54 pages of abridged descriptions of the various towns and their local conditions.



A Large Lathe for Turning Heavy Work Such as Steel Rolls and Pinions

A Recent Quick Change Gear Engine Lathe

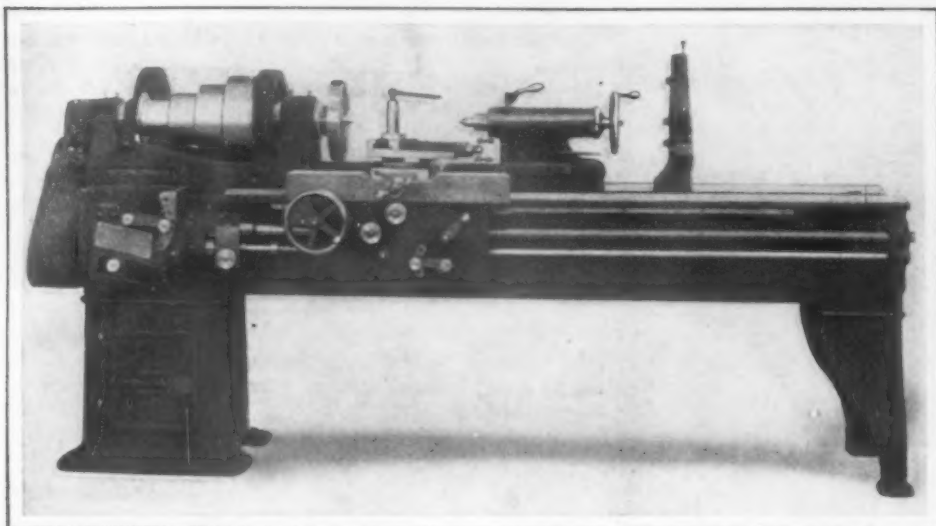
An improved quick change gear engine lathe has been brought out by the Cincinnati Lathe & Tool Company, Cincinnati, Ohio. The tool is now being built in 14, 16

front end and has a bronze nut for the screw. It is locked in any position by a clamping device.

The countershafts are furnished with double friction, self-oiling clutch pulleys, and it is pointed out that it is not necessary to throw off the driving belt nor stop the countershaft when applying the lubricant to the bushings. Heavy pressed steel hangers of the double brace type having ring oiling bearings are used. The builder recommends that these countershafts run at a speed of 140 r.p.m., but in its own shop some of them are running at 400 r.p.m., and it is also possible to obtain many speeds by a two-speed countershaft of sufficient range.

The lathes are regularly furnished with a double wall apron, chasing dial, automatic stop, cabinet leg, plain or compound rest, center and

follow rests, large and small face plates, wrenches and a countershaft. They can be furnished in the length of bed desired, with a turret on the carriage or bed.



A Recently Developed Quick Change Gear Engine Lathe with a Three-Step Cone Pulley and Double Back Gears

and 18 in. sizes. The beds are made of semi-steel, reinforced by internal box-section girths, and are designed to give rigidity under heavy cuts.

In addition to the style of headstock shown, a three-step cone pulley with double back gears, four and five-step cone pulley headstocks with single back gears are also made. The construction of this part is also heavy to absorb vibration. The spindle is a high carbon steel forging, finished by grinding and lapping. There is a collar at the nose end for supplying a rigid bearing when chucks and face plates are used and a thrust bearing at the rear end of the spindle consisting of a hardened tool steel collar for taking up the wear.

The apron, which is of box type construction, is bolted rigidly to the carriage. A double support is thus afforded to the shafts and studs mounted in it. The rack pinion, which is made of steel, is located close to the rack on the bed, and motion is transmitted to it by compound gearing, all the gears being of a pitch to withstand the stress imposed upon them by the heaviest cuts the main driving belt will handle.

In screw cutting work a thread chasing dial permits the half nuts to be opened, the carriage to be run back by hand and the thread to be caught or picked up at any point without reversing the lathe. An automatic stop is provided for throwing out the feeds. The carriage has a bearing on the V's of the bed for its entire length and is gibbed both in the front and at the back.

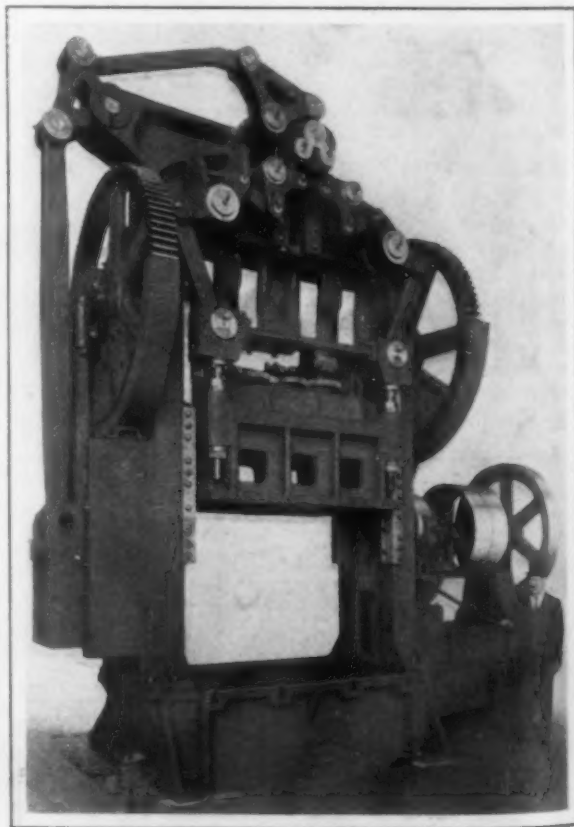
The reverse plate for cutting right and left hand threads is on the outside of the headstock and is used only for reversing the lead screw when cutting threads, and not for reversing the feed, the feed reverse being located in the apron. A quadrant at the end of the lathe allows for a combination of extra or metric pitches with U. S. standard lead screw or vice versa, in addition to those provided by the gear box, to be obtained at once by simply shifting two levers. In this way the facilities of a standard lathe are provided and each gear will cut not only the pitch required, but others through the series of gear box changes, it being possible to make these changes while the lathe is running under a heavy cut. The screw cutting and feed mechanism is a complete unit, assembled in a box mounted on the front of the bed. The location of the index plate, which is attached to the box, enables the operator to see at a glance the correct setting for any thread or feed.

The tailstock has a long bearing on the bed, and, like it, is massive and well ribbed. The offset type of construction is used for the tailstock, thus permitting the compound rest to be set in a plane parallel with the bed. The spindle, which is of large diameter, is supported at the

Double-Action Toggle Drawing Press

A double-crank double-action toggle drawing press, embodying a number of new features in its construction, has been brought out by the Toledo Machine & Tool Company, Toledo, Ohio. These features include a mechanism for transmitting the power to the rocker shafts and the providing of a rigid support for these shafts.

The use of this type of mechanism for transmitting the



A Recently Developed Large Double-Action Double-Crank Toggle Drawing Press

power centrally to each of the two rocker shafts is calculated to reduce the tendency to torsion between these shafts and to simplify the construction. In this way, it is pointed out, it is only necessary for power to be transmitted from the crankshaft on the left side only, doing away with the additional drive or mechanism for transmitting the power from each of the two sides. The rocker shafts run through the solid arch of the press, from the front to the back, thus getting the rigid support and short distance between the toggle joint supports or bearings. The practical elimination of torsional strain has been noted, especially on the wider patterns of double-crank machines. The employment of the builders' patented toggle movement, in conjunction with these other two features, gives a dwell of the blank holder during the drawing operation.

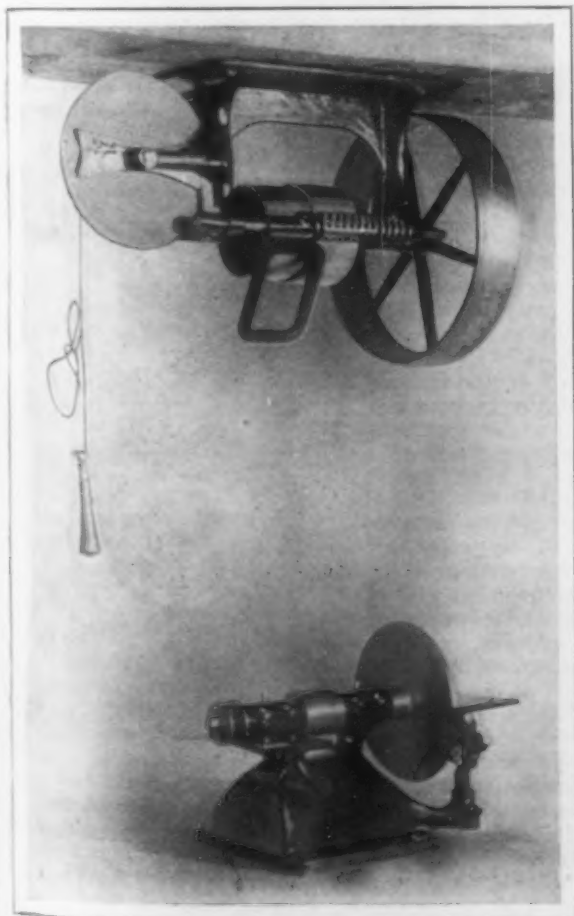
The specifications of the machine, which is designated as the No. 258- $\frac{1}{4}$ press, include the following: Width between housings, 84 in.; plunger stroke, 29 in.; blank holder stroke, 18 in.; complete weight of machine, 135,000 lb. The machine is built in a variety of sizes and capacities and with different widths between housings.

Small Bench Type Disk Grinding Machine

For meeting the needs of the small shop the Bickford Machine Company, Greenfield, Mass., has brought out a small grinding machine of the disk type. Two wheels are mounted and it is possible to grind work either square or on a bevel with one wheel, while the other one takes care of work held on either side of it, this arrangement giving a combination of disk and tool grinding machines.

The spindle at the left end will take any wheel having a $\frac{1}{2}$ -in. hole and a diameter not exceeding 8 in. There is a plain rest on this end which is mounted $\frac{1}{4}$ in. below the center of the spindle, and is arranged to support work held on either side of the wheel. The wheel at the right is 9 in. in diameter and the single flat rest which is provided is adjustable, so that work may be ground either square or on a bevel. The spindle is $\frac{3}{4}$ in. in diameter.

The countershaft supplied was especially designed for use with this machine and is operated by a pull cord.



A New Small Disk Grinding Machine with a Special Form of Countershaft Intended for Use on a Bench

There is a disk, not shown, mounted with the larger one. This latter disk is operated by four ratchet teeth cut in each of the disks. On the rod carrying the belt loop is a coil spring to keep an arm on this rod in contact with a lug on the larger disk, the form of this lug being such that a quarter revolution of the disk will shift the belt either off or on. The smaller disk is returned to the proper position by a pull spring, so that repeated pulls of the cord shift the belt back and forth. All of the pulleys on the countershaft are arranged for use with a $2\frac{1}{2}$ -in. belt, the diameters of the tight and loose pulleys being 5 and $4\frac{1}{2}$ in., respectively, and that of the large one 13 in.

A Special Envelope for Shop Messages

It Is Used Over and Over and Has
Worked a Considerable Saving

In many industrial works the written intercourse between the office and the departments and between the departments themselves is carried on by the use of envelopes



Special Envelope for Shop Messages

which are torn open and thrown aside by the recipient. It is desirable that most letters and orders, memoranda and records be kept clean, and the envelope serves this purpose. The general manager of the Royal Typewriter Company, Hartford, Conn., noticed an increasing expense for envelopes, amounting to a figure well worth study from the standpoint of economy. The plan was hit upon of making each envelope carry not one but many messages, one after the other. A tough paper was selected for its material, to withstand long service. The envelope is $10\frac{3}{4}$ by $4\frac{1}{2}$ in. and upon its face is printed the checkerboard pattern shown in the illustration.

The name of the individual or the number of the department is written in one of the squares, originally the one following the word "For." Upon receipt by Mr. Wells, the first to get the envelope, he removes its contents and lays it aside for his own use. He has a message for Mr. Foster, whose name he writes in the second square; then the envelope is carried to Mr. Foster's department, and he in turn saves it. And so it continues, back and forth, from department to department, until the 64 trips, as represented by the number of squares, have been made. Each department head always has a bunch of the envelopes on his desk, ready to carry his messages.

The saving amounts to many thousands of envelopes annually. Generally speaking the number formerly used for this special purpose has now been divided by 64. The general manager's office alone receives more than 20,000 messages of this character in a year, and the number sent out by him is much greater. A corresponding condition exists in other departments of the management. Moreover, it has been found that messages are not so apt to be mislaid or lost. They may be received by a department head, for example, when he is away from his office. The envelope must go back to his desk with him, and with it the message.

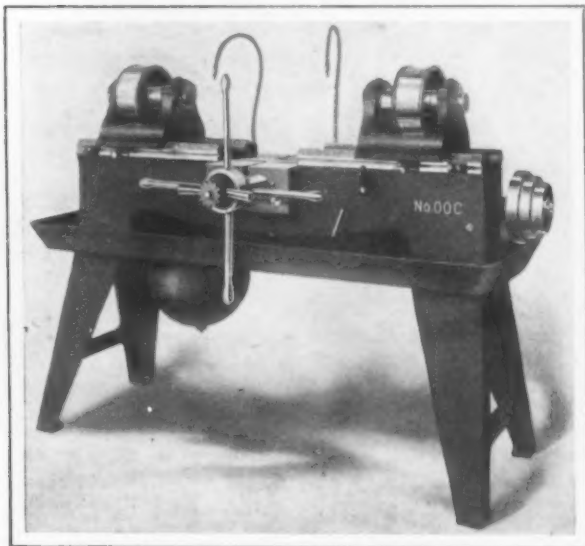
The New Haven Manufacturers' Exhibit Association, New Haven, Conn., has issued a directory of the exhibit which was formally opened May 15, 1912. This is one of the very few permanent manufacturers' exhibitions in the United States, and was planned for the purpose of advertising New Haven and placing it in its proper position before the world as a manufacturing, business and educational center. After some views of the various public buildings of the city and a brief description of the municipality and its advantages, a number of illustrations of the different exhibits are given.

New Duplex Horizontal Drilling Machines

To secure the benefit of machining work simultaneously from opposite ends, the Garvin Machine Company, Spring and Varick streets, New York City, has brought out a line of duplex horizontal drilling machines, which have fixtures for drilling, counterboring, turning or hollow-milling. It is claimed for the machine that facing is not only done in practically half the time consumed in single-spindle operations, but the accuracy of the machine provides an alignment that is also found of advantage.

The rapidity with which the work is turned out depends largely upon the style of fixture used. With a view to avoiding chip troubles, the machines were designed with large V-style guides for the head, the space between being open and thus affording no lodging place for an accumulation of chips. There are a number of sizes of the machine built, the No. 00 size, which is the one illustrated, having a capacity for $\frac{7}{8}$ and $\frac{3}{4}$ in. drills for the screw and rack feed types respectively.

The rack-feed machine, which is the one illustrated, is made in four styles, though the general construction



One of a New Line of Duplex Horizontal Drilling Machines in Which Both Heads Are Controlled by a Single Capstan Wheel

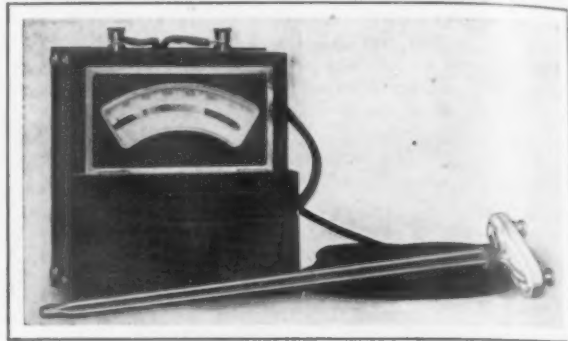
is the same for all. The head slides on V's of ample proportions and taper gibs are provided underneath to guard against lifting stresses and wear. A depressed surface 12 in. square with a T slot planed from the solid is located in the center of the machine. The slot is square with the V's, thus providing a means for clamping fixtures and quickly interchanging them.

The heads in the machine shown, the style C, are fed simultaneously by power feed, there being three changes. Automatic adjustable trip stops and micrometer stops are furnished to enable duplicate work to be turned out readily, and when the feed is tripped the heads are returned immediately to their original positions through the unwinding of an adjustable barrel spring. The spindles are hardened and ground and run in bronze boxes. It is possible to disengage the left head by operating a friction clutch device, to give a close adjustment for covering the variation in the length of drills or turning tools, as well as acting as an adjustment to take care of the wear of tools in sharpening. With this independent friction adjustment, it is pointed out that turning to exact shoulders or facing to exact lengths and other similar uses are fully controlled.

In the type A machine the heads are independently controlled by hand capstan wheels, there being two working positions for long or short pieces. Micrometer stops for use in facing work are provided with this machine. The style B machine is identical with the style C except that the heads are moved by hand through a centrally located capstan operating through a rack and pinion feed. The style D machine is designed to cover numerous special requirements in duplex drilling, the sliding heads being replaced with sliding plates, upon which various single or multiple drilling heads can be mounted. These heads can be fed either independently or simultaneously by hand or by automatic power feed.

A Pyrometer for Molten Metals

For measuring the temperature of molten copper, bronze, brass, aluminum and other metals, the Brown Instrument Company, Philadelphia, Pa., has placed on the



A New Type of Thermo-Electric Pyrometer for Measuring the Temperature of Molten Metals, Such as Aluminum, Brass, Bronze, Copper, Etc.

market an improved type of thermo-electric pyrometer. The thermo-couple, the rods of which are large, will, it is pointed out, withstand the action of the molten metal for a reasonable length of time.

The device is a high-resistance portable indicating instrument, for ordinary foundry service, with a thermo-couple formed of nickel alloy rods $\frac{3}{4}$ in. in diameter. Because of the size of the rods it is felt that the life of the thermo-couple has been increased. The thermo-couple is, of course, inserted directly into the molten metal, say, before pouring, and the temperature is instantly noted. When the proper pouring temperature for a certain metal has been definitely determined, it is emphasized that it is possible to secure uniformly good castings.

A Coal Meter

An interesting recording device which was first applied to the automatic stoker of a steam-boiler plant and which has therefore been given the name coal meter is shown

in the accompanying reproduction of the photograph of the instrument or device. Briefly described, it is a neatly inclosed simple train of light spur gears for actuating a counter similar to that noted on cyclometers. Every turn or new figure of the cyclometer group of figures indicates a turn of the driving spur wheel of the meter. As installed with, say, a Jones underfeed stoker, the readings give the number of revolutions or number of strokes of the ram of the stoker. It is a simple thing to ascertain by measurements of



The Coal Meter

the coal supplied over a given time what is the average amount of coal corresponding to each change of reading of the meter; and so one is able to get, by multiplying the difference of meter readings for any desired period of time by the amount of coal corresponding to each revolution or change of number, the total weight of the fuel supplied in the time interval considered. It seems obvious that the meter can be applied widely for measurement of various sorts of material handling apparatus. It remains

chiefly to provide for a mechanism which will revolve the meter in accordance with the movements of the apparatus to be metered and to ascertain the amount of material moved on the average for every revolution of the meter.

The meter itself is made of white metal and the accompanying view is about one-half the actual size, the outside measurements being $6 \times 2\frac{1}{2} \times \frac{5}{8}$ in. The moving parts consist of a light driving gear wheel, a driven wheel actuating the counter and a little spur gear connecting the two larger gears. The casing is designed to provide a device dust, heat and steam proof. It may be added that on account of its attachment, for example, to a stoker, it registers a fuel actually being fired in a given period, rather than, for example, the amount being delivered from a coal bunker or to a stoker hopper. It is made by the C. J. Mfg. Company, 3425 North Fifth street, Philadelphia, Pa.

A New Gauge for Internal Measurements

A ball gauge has been placed on the market by the Atlas Ball Company, Philadelphia, Pa., for the measurement of internal diameters. It consists of a ball with a handle attached and is intended to be used as a radius gauge and for measuring internal diameters as a sub-



Fig. 1—Calibrating the Ball Gauge

stitute for the cylindrical plug gauges. It was developed by the company to perfect measuring devices which would be capable of indicating minute variations in diameters. The calibration of the ball gauge by a measuring instrument is illustrated in Fig. 1, while Fig. 2 shows the gauge in use for measuring the diameter of a bored hole in a piece of lathe work.

In making steel balls, the company has always used Johannsens Swedish gauge blocks for calibrating the measuring instrument used. This instrument, shown in Fig. 1, is very delicate, its entire range of measurement being only 0.002 in. It is used to measure the balls in the process of manufacture, especially after they have been ground. After a time it was found that the constant use would wear a slight hollow in the points of the machine, which resulted in a slight error in reading the size of the ball tested. For this reason, after the instrument had been once set by the gauge block, all the subsequent calibrations were made by a master ball, which, since it was of the same shape and contour as the standard ball, compensated for the slight wear on the points of the machine.

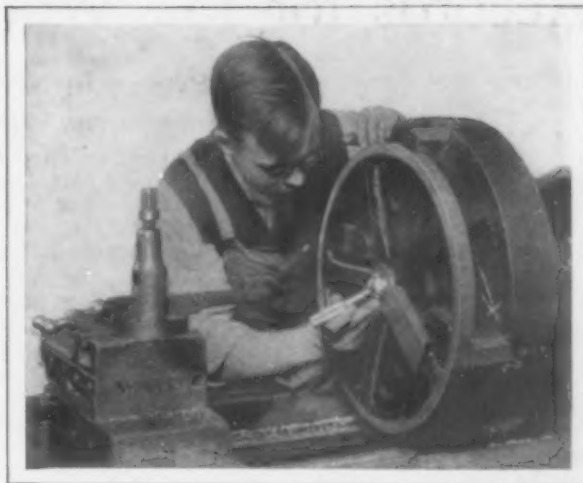


Fig. 2—The Gauge in Use for Measuring Bored Holes in Lathe Work

While perfecting these minute measuring devices the idea was conceived of attaching a handle to the ball to facilitate handling, and also to overcome the temporary expansion due to the heat produced by holding the ball in the hand too long. One of the advantages of a ball gauge is that it can be applied at an angle, as shown in Fig. 2.

The handle is attached to the ball by electric welding, a series of water-cooled dies being employed to prevent the temper of the ball from being drawn during the welding operation. The gauge can be used as a limit gauge, two balls being mounted at opposite ends of the ferrule, with diameters 0.001 in. over and under size. To facilitate the handling of a gauge of this kind the ferrule on the minus end is smaller than at the plug end, so that a workman can tell by the feel which end he is using without having to look at the figures on the handle.

Bethlehem Gas Engines for Sparrows Point

The Maryland Steel Company has given the Bethlehem Steel Company, South Bethlehem, Pa., a contract for five single tandem gas-driven blowing engines, each having a capacity of 20,000 cu. ft. of free air per minute. The engines are to take the place of steam engines at the blast furnace plant at Sparrows Point, Md. They are duplicates of the five blowing engines the Bethlehem Steel Company is now building for the Minnesota Steel Company and have steel cast cylinders. The cylinders are said to be larger than those of any other engines built in this country.

Departing from the custom that had been followed of using one twin tandem engine and half of another twin to blow one furnace, the Bethlehem Steel Company originated at its own blast furnace plant the plan of using two single tandem engines to a furnace. This was so satisfactory that both the Minnesota Steel Company and the Maryland Steel Company have adopted the same method.

Meeting of Graton & Knight Belting Salesmen

In accordance with its policy adopted a number of years ago, the Graton & Knight Mfg. Company, Worcester, Mass., oak leather tanner and belt maker, recently held a salesmen's convention at its main factory in that city. This convention was attended by the company's salesmen from all parts of the country, and the various sessions were devoted to an inspection of the factory, a study of methods of manufacture and the sale and application of the company's products. At the conclusion of the convention a banquet was served at which more than 100 officers, salesmen and other employees were present. A feature of this year's meeting which was especially inspiring to those in attendance was the presence of Henry C. Graton, founder of the business. To a very large extent the phenomenal growth of the business from a small belt shop in 1851 to a plant that is one of the largest of its kind in the world is to be attributed to the sagacity and wisdom of Mr. Graton and his early associates, and to the persistent adherence of the firm to the policy early adopted of endeavoring to meet the steadily increasing demands for the most serviceable leather belting.

Records for the Works Publication Bureau*

A System for Keeping Track of the Photographs, Cuts and the Literature Issued by a Manufacturing Company

BY A. D. WILLIAMS

Photographs, illustrations and printed matter are essential requirements of pretty nearly every business concern. The larger the business and the greater variety of these items handled, the more important do these three essentials become and the more trouble it is to keep track of them. Almost any method will suffice to care for a few cuts and publications, but increasing numbers is a different case. The system that seemed simplicity itself and so complete and elastic when there was very little to be covered becomes hopelessly involved when it is necessary to account for a number of cuts and negatives and numerous publications. In many cases it costs less to make a new photograph, have it retouched and get a new cut than it does to find the block which has been safely put away.

serial numbers to all negatives made. The 5 x 7-in. negative is adopted as a standard, but other sizes are provided for, as in many cases it is impractical to adhere rigidly to the selected size. A number of 8 x 10-in. negatives are used. Each size of negative or film is filed together, a series of 1000 numbers being assigned to each size used, or if the size is used frequently several thousand consecutive numbers being reserved to it. The numbers from 30,001 up may be reserved for the 5 x 7-in. size. By the time the series assigned to a size has been exhausted sufficient data will be in hand to show the relative frequency with which each particular size is used and this will assist in assigning a higher series of numbers to it.

Each negative is marked with its number and the date

[illegible]

Fig. 1—Negative Numbers Issued to Operator, 3x5-in. Card. The Remarks Column May be Used to Indicate Unused Plates Returned, Etc. A Line on the Efficiency of the Operator May be Obtained from the Cards

[illegible]

Fig. 2—Information Card Turned in by Operator. 3x5-in. Card. One Card is Issued with Every Plate. The Photographer Fills in Shop Order Numbers and Such Other Information as Will Serve to Identify the Subject. If Desirable, Exposure Data, Such as Time, Light, Stop, Etc., May be Included

In designing a system to keep track of these matters it is desirable to provide for recording the following facts:

1. The machine, part or material photographed, care being taken to get the correct engineering designation, the shop order number, serial number of machine and, in the case of special machines, the name of the concern for which it is being constructed.
2. The owner of the original negative or the concern from which the photograph was secured.
3. Whether wash drawings, line drawings, or retouched photographs exist and where they are filed.
4. The kind of cut made, as zinc etching, half-tone, wax engraving, wood cut, etc., electrotypes. The record showing whether these are on hand or at the printers.
5. The name and address of the concerns to whom cuts have been sent, or from whom cuts have been ordered, giving the number of the block and such other data as are pertinent to the particular case.
6. The progress and cost of getting up cuts and publications and an approximate record of their service or the time it takes for the stock of a publication to reach the set minimum.
7. A record of all publications issued.

Index cards are used for the largest portion of these data, but the original entry, the serial number of the negative, is made in a bound book having space upon one page for the record of ten negatives and in a 100-page volume space for 1000 negatives. This method makes the record practically self-indexing, as the number on the back of the book is the thousands of the negative numbers entered in it. That is, Book 31 records negatives from 31,001 to 32,000.

The key to the system consists in the assignment of

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made, these numbers showing in the lower right hand corner. For indexing purposes, two or more prints are made upon 5 x 8-in. double weight paper. One of these prints is used in the numerical index and as many prints as are necessary properly to classify the subject are made for the subject index. In the case of the 5 x 7-in. negatives, 1 in. is available at one end of the card for any necessary notation, this blank coming at the left hand end. When other sizes of negatives than the standard are indexed, they are printed full size upon the card or enlarged or reduced to as near 5 x 7 in. as practicable. This method is found extremely satisfactory, as it shows the entire picture and keeps the index in standard sized cabinets.

When it is possible to do so, the negative number, the date, the shop order number and the serial number of the machine are made a part of the photograph. A set of numbers and some letters, printed in black on white card with a small frame in which they can be set up to give the negative number in the top line, the date in the line below, the shop order, preceded by the letters "SO" in the third line and in the bottom line the serial number of the machine, is included in each photographic kit. On starting out the operator is supplied with negatives and a numbered card for each, Form No. 2. A record of the numbers issued is made upon Form No. 1. Before making an exposure the operator enters on Form No. 2 the data in regard to the picture and such other data as he is directed to obtain. After the exposure is made and the plate holder removed from the camera the operator slips the card into the groove of the plate holder in front of the slide so that the card and the negative it represents are kept together. After the plates have been developed the card for spoiled plates, duplicated exposures, etc., are marked so that these numbers can be reassigned. These cards form a complete

sent out for any purpose. These cards are filed in an alphabetical index under the name of the concern to whom the blocks have been sent, either for printing, for making electrotypes or for any other purpose. This card serves as an order for shipping the cuts and as a check list on their return, or as a check list of the return of the proper number of electros from the electrotyper. All of the blocks for a single publication are entered on consecutive cards and shipped together. These cards are a very effective check upon those printers who plead delays in receiving cuts. This card is also used to keep track of cuts ordered and electrotypes ordered. The cards used for this purpose are filed in an index under the date upon which the de-

filed by the cut numbers, but when it becomes necessary to keep close track of a cut a duplicate card is made out and filed in a date ahead index, so that it will be brought up for attention at appropriate intervals.

The foregoing method is used for all cuts which are made from photographs, but there are cases in which the cuts are made from wash drawings, line drawings, models and even from the article itself, or cover designs, three and four color work cuts made from drawings, paintings or models and tint blocks. When it is possible to do so a photograph number is taken out for such cuts and a photograph made of the design or model before it is sent to the engraver. There are, however, some cases in which

Order.....	Date.....
Publication.....	
Class.....	
Number to be printed.....	
Copy Complete.....	Cuts Complete.....
Sent Printer.....	
First Proof Received.....	Returned.....
Second Proof Received.....	Returned.....
..... Proof Received.....	Returned.....
..... Proof Received.....	Returned.....
Complete.....	

Costs	Copy.....	Total
	Negatives Made.....	
	Mounted Photographs.....	
	Retouching.....	
	Wash Drawings.....	
	Line Drawings.....	
	Cover Design.....	
	Half Tones.....	
	Zinc Etchings.....	
	Wax Engravings.....	
	Wood Cuts.....	
	Electrotypes.....	
	Composition.....	
	Revision.....	
	Make-up.....	
Electrotyping.....		
Press Work, Body.....		
Press Work, Cover.....		
Paper, Body.....		
Paper, Cover.....		
Bindery.....		

Fig. 6—Face and Reverse of 3x5-in. Card for Publication Order Record. The Back is Used for a Cost Summary and the Cards are Filed by Order Numbers

Publication.....				
Order No.	Date	Quantity	Cost	Remarks

Fig. 7—Publication Cost Record, a 3x5-in. Card Used to Keep a Summarized Record of Costs of Publications

PHOTOGRAPHIC PRINT ORDER	
Photo. No.....	Date.....
Charge to.....	
Unmounted.....	Glossy.....Matte.....
Mounted on Card.....	Enlarge to.....
Mounted for Binder.....	
Mounted for Retoucher.....	
Special.....	
Ordered by.....	
Approved by.....	

Fig. 9—Photographic Print Order, 3x5-in. Card. The Back of the Card is Blank for Listing Those to Whom Prints Are to Be Sent, Etc.

(Subject or Classification)
(Classification or Subject)
(Edition Number)

Fig. 8—Publication Index Record, 3x5-in. Card. The Class Index Card is Filed Numerically Under the Proper Class and the Subject Index is Filed Alphabetically by Subjects

CUT ORDER	
Photo. No.....	Date.....
Charge to.....	
Publication.....	
Kind of Cut.....	
Ordered by.....	
Approved by.....	

Fig. 10—Cut Order Card, 3x5-in.

livery of the blocks is expected, which makes it an easy matter to follow up rush orders.

Form No. 5 is made out for every cut or block requisitioned. These cards serve to keep track of the cuts being made, their cost and eliminate that chance of duplication which would be open, while the retouched photograph is at the engravers. These cards are kept in the current file until all the vouchers connected with a block have been passed for payment. Ordinarily these cards are

this procedure is impracticable and to cover such cases a series of cut numbers preceded by the letter "Z," is used. The blocks for color work are designated by the letter "X" preceding the number and a sub-number following it giving the number of blocks in the set. The print order and cut order cards, which have to be signed by the one desiring the print or cut to be made, are self-explanatory.

Three forms are used in keeping track of publications. Form 6 is used to keep track of the cost, the various dates being filed in the current index by the number of the pub-

lication with a cross index card in the date ahead file. Form 4 is used in connection with this to keep track of all the cuts which will be required. Form 7 serves as a publication cost summary record and shows time required to use each edition. The remarks column on this card is intended to give space for a brief notation showing whether the publication has been revised or rewritten when getting out new editions. Form 8 is fully explained by the title beneath it.

The Roe Mechanical Puddling Process

Details of the Two Large Furnaces Operated by the Reading Iron Company

A paper on "The Latest Development of the Roe Puddling Process" was read before the Staffordshire Iron and Steel Institute at Dudley, England, April 5, by David E. Roberts. The author described the Roe puddling furnace as first installed by the Glasgow Iron Company, Pottstown, Pa., and also indicated the new features in this furnace as built at the plant of the Reading Iron Company, Reading, Pa. The Pottstown furnace is 22 ft. long inside by about 9 ft. wide. The new furnaces at Reading are 26 ft. long by nearly 12 ft. inside. A synopsis of the paper follows:

The aim all along has been to deal with quantities on lines similar to what is common in steel making. The new furnaces have made heats well over 6000 lb. and that weight is well within the capacity of the furnace. The gain in weight shown by the experimental Pottstown furnace has been confirmed and improved upon in the new furnaces at Reading, and sometimes reaches 11 per cent. The following are actual figures:

Pig charged	5300 lb.	Billets	5855 lb.
Pig charged	5450 lb.	Billets	6080 lb.
Pig charged	5150 lb.	Billets	5760 lb.

This is due partly to iron reduced from the oxide in the cinder, and also to the absence of any waste by surface oxidation after the process is complete, for the ball is discharged into the squeezer immediately on being made.

Changes Made at Reading

The Reading plant consists of two furnaces, but has been so designed that it can conveniently be extended to twelve. The furnace bottom, originally a straight line, is now curved, the two ends rising. This is done for two reasons: one, that it is found in operation that to keep the bottom clean about half of it must always remain exposed to the flames and thus kept hot. The incline also gives the charge a more rapid start at the beginning of each descent. First of all, through a suitable door is inserted the fettling, which consists of puddle tap cinder in a remelted condition. This melting is done in another small tilting heating furnace close at hand. The puddling furnace is then rocked a few times, until this fettling washes well over the bottom, and then the molten charge is put in and the operation commences. The conditions of operation being the same exactly as those in an ordinary puddling furnace, a similar cinder is required, and an important point is its proper production and maintenance, both chemically and physically, i. e., the correct amount of silica and oxide of iron. The quantity of fettling necessary is, of course, regulated by the quantity and the quality of the iron used. The furnace is rocked upon hollow trunnions, and through these trunnions gas and air come in and combustion takes place. The roof is raised at the center to give room for combustion. There are two curved chimneys on each end of the furnace through which gases escape, and when the rocking proceeds the gases escape from the chimneys under a large canopy which practically covers the whole furnace, and the heat escaping from the chimneys under this canopy heats the air for combustion in what is called the "recuperator," this air later entering the furnace. The speed of rocking is controlled to fit the conditions as they change during the process.

When the iron is molten the furnace is moved very little and gradually, but as the process begins to develop then the amount and speed of the rocking increases, and eventually, as the iron comes to nature, dries up, and the ball is formed, it develops to the maximum. The proper manipulation of the oscillations enables the entire mass to be uniformly finished, this being assisted by the great

width of the bottom. Care, of course, has to be taken that there is no raw iron present when the final massing by impact takes place to form the ball. At the final movement the door at one end of the furnace is opened and the ball is thrown out into a cradle waiting to receive it. It may be interesting to note that the first heat made in this new plant was accidentally deposited on the floor instead of the cradle. This was due to a defect in the apparatus controlling the door, which was only half opened. This huge puddled heap now stands aside as an interesting relic of early troubles.

The receiving cradle puts the ball into the hydraulic press, and there it is subjected to heavy pressure all over, and a slab is produced about 28 in. wide by about 7 in. thick and about 12 ft. 6 in. long. All sides of the press for squeezing the block are perforated to allow the cinder to get away.

Fifteen Times the Old Output Per Man

The furnaces are each capable of turning out a heat approximately once an hour, and although they are called 2½-ton furnaces, yet a few times, as already stated, heats have amounted to well over 6000 lb. The highest amount we have obtained has been 6100 lb. It was found that at first the time taken to complete a heat was on an average a little longer in these new furnaces than in the old one—this was due to the fact that the men were not familiar with all the new conditions of the larger size of furnace. Each furnace is good enough for about 30 tons output per day of twelve hours, and approximately, on a reasonable basis, 300 tons a week each. There must be considerable economy from the labor point of view, as each furnace only requires three men, one puddler and two helpers, one of whom does the rocking of the furnace—that is, 30 tons a day with three men, or 10 tons per man, as against the present output of something between 0.6 or 0.7 tons per man per day, a difference of, say, 15 to 1. The actual cost of production cannot very well be detailed in this paper, but approximately it may be taken that the inventor's estimate has been confirmed, viz., that these slabs can be produced for nearly the same cost as open-hearth ingots of similar weight.

In the discussion of Mr. Roberts's paper, J. W. Hall said that undoubtedly anything which would avoid the difficulty existing in the English iron trade in finding puddlers should be welcomed; but the trouble as to the Roe plant seemed to him to be the enormous cost. Ordinary puddling furnaces are very cheaply operated, and part of the fuel utilized in raising steam. He thought Mr. Roberts had satisfied the Institute that the process was a practical one and that it could be worked in a practical way, but he was afraid that very few of the Staffordshire works were of sufficient size to take it up. Moreover, producing material in these large masses would demand very large mills, instead of the very simple and comparatively cheap puddled bar mills which are at present usual.

Mr. Roberts replied if individual firms could not take the matter up, perhaps a group of them could by joining together. Roughly speaking, the reduction in cost possible by making billets by this process was £1 per ton, and with such a saving as that a good large capital expenditure was justified. It was vital to the process that large quantities should be dealt with. The practicability and economy of the process are shown by the fact that it answered so well that the Reading Iron Company, after thoroughly considering the matter for about two years, is now on the third furnace and is extending its buildings ready for the fourth and fifth and sixth furnace. That is also an indication that the quality was right. Users could arrange to turn out any quality required.

The Stark Rolling Mill Company, Canton, Ohio, has published a revised and enlarged issue of its booklet on Toncan Metal. Part I is devoted to technical information regarding the qualities of this metal and to discussing rusting and corrosion from a metallurgical standpoint, comparing iron with steel and other products. Part II is entirely illustrative, containing interesting comparative exposure tests and numerous photographs of present installations of Toncan Metal all over this country. Part III is a very complete catalogue of the many shapes in which this metal is sold. The booklet is a praiseworthy specimen of artistic printing and engraving.

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The Swing in Pig Iron Prices

Last year's upward movement in pig iron prices involved a total advance of about \$4 a ton, of which 40 per cent. has since been lost. A close statistical comparison of the price movements confirms opinions generally held in the trade as to the nature of such swings. In the first place, while the different markets move somewhat variously from week to week, the total amount of the swing from low to high and down again does not vary greatly in different districts. Again, when the market advances at a certain rate, whether slow or fast, it is likely to decline eventually at that same rate. The converse of this last-named proposition could not also be true, of course, without all upward and downward movements being at the same rate, and it is well known that this is not the case. The market may move downward slowly, and then advance rapidly, or move downward rapidly and then advance slowly. A long range study of prices in the iron trade, indeed, shows that this is precisely the case. Considering the whole market movement as departures above a low level, the peaks are symmetrical, but considering the market movement as departures downward from a high level, the dips are not symmetrical. This, of course, is perfectly natural, for it is the low level rather than the high level which is relatively fixed. The former is established more or less closely by the cost of production, whereas at the other end there is represented simply the ability of buyers to pay, which has no element of fixity in it corresponding in force with that of the production cost level.

To make a statistical comparison most illuminating it is necessary, of course, to average different districts, and it seems well from various considerations to select foundry iron. Bessemer and basic iron must necessarily follow foundry iron to an extent, but activity in the steel industry, which is more or less separate marketwise from the foundry iron market, introduces a disturbing element. We select, therefore, foundry iron in the five prominent markets, Philadelphia, Mahoning and Shenango Valleys, Buffalo, Cleveland and Chicago, taking prices at furnace, except with Philadelphia, and add Southern iron, delivered at Cincinnati. No. 2X is taken in the case of Philadelphia and Buffalo.

It is necessary also to select dates for making the comparison, and we select January 31, 1912, which represented a low point, though for a few weeks before and after there was no material departure. Next we take the high point, which was represented by our quotations of January 2, 1913, though for two or three weeks on either side there was no material variation. Next we take prices at the present time, showing a decline from those at the beginning of the year; and to complete the presentation we select the date in the advancing movement at which average prices were closest to the present. This time falls in last September. Prices quoted, according to our files, were as follows, compared with those of today:

	Jan. 31, 1912	Sept. 25, 1912	Jan. 2, 1913	Apr. 30, 1913
Philadelphia.....	\$14.85	\$16.85	\$18.50	\$17.25
Valley.....	13.00	15.00	17.50	15.00
Buffalo.....	13.75	16.25	17.25	15.75
Cleveland.....	13.25	15.90	17.75	15.90
Chicago.....	14.00	16.50	18.00	16.75
Cincinnati.....	13.25	16.25	17.25	15.25
Average.....	\$13.68	\$16.12	\$17.71	\$15.99

The total advance from low to high point averaged \$3.03, according to the above compilation, occurring last year in the 11 months after January; but by far the major portion of the advance occurred between the middle of August and the end of November. The decline from the high point to date has been \$1.72, or 42 per cent. of the advance. On September 25, 1912, the average price, as shown above, was \$16.12, or 13 cents higher than the present level of \$15.99, but our quotations of a week earlier showed an average of \$15.83, or 16 cents lower than the present average. Thus the advance which the recent decline balances required somewhat more than three months, against barely four months for the decline. Such a comparison is not exact, for the high level was not clearly marked as to date. Similarity between the advance and decline is more clearly shown by observing that last September prices were advancing rapidly, whereas in the past month they have been falling rapidly. As prices approached the high point they moved upwards slowly, and likewise as they receded from the high point they moved slowly. In some quarters the present year was well under way before it was clearly recognized that a definite decline had set in.

A statement of the total advances by districts brings out some interesting points. These advances, drawn from the table already given, and occurring during 11 months of last year, were as follows:

Philadelphia	\$3.65
Valley	4.50
Buffalo	3.50
Cleveland	4.50
Chicago	4.00
Cincinnati (Southern)	4.00
Average	\$4.03

The greatest advances, \$4.50, were at Valley and Cleveland points. Whatever may have been the cause of the specially great advances, the declines have been in proportion, for the Valley market has since lost \$2.50 and the Cleveland market \$1.85, while the other four markets have lost an average of only \$1.50. It will also be noted that both Valley and Cleveland markets have worked back to their level of September 25, 1912. Thus they have, approximately, resumed their parity with other markets.

Is the pig iron market now to continue declining until it reaches its former low level? Obviously statistics furnish no warrant for any such conclusion, for the market dips much lower on some occasions than on others. Under precisely similar conditions the market will always act the same way. If there is a difference in the result, one or more of the various conditions must be different. The conditions in September, 1912, when prices were the same as at present, should therefore be considered. If we reckon up the differences in conditions, between now and last September or the period immediately preceding, we have a list of those conditions which must change in order to permit the market to continue receding and approaching its former low point.

As to coke, we have substantially the same prices; but prior to last September there had been an important rise, and many contracts were in force which had been made for the calendar year 1912, at \$1.65 to \$1.75. There is coke at no such prices now under contract.

Lake Superior ore was 65 cents lower as to Bessemer and 55 cents lower as to non-Bessemer. The

advanced prices were fixed for this season, and it is argued that there is no incentive for the ore interests now to reduce prices, as they have so much ore sold under contract.

Labor is much scarcer and wages are somewhat higher than in last September.

There are more merchant furnaces in blast now than in September last, which may be called a bear argument if stocks are disregarded; but last year stocks were being used up and at the present time, if they are accumulating at all, they are not accumulating at a corresponding rate. Furthermore, when there are more furnaces in blast there is a larger proportion of the relatively less fit furnaces operating, which means that the average cost of production is higher, and it requires less of a dip to shake out some furnaces.

Thus, so far as factors within the iron trade are concerned, we have neither a duplication nor the prospect of a duplication of the conditions of last September and immediately preceding months, and hence the present showing is not that the pig iron market will continue to decline at the rate at which it was advancing prior to September. Finally it may be added that when prices were lowest, in the winter of 1911-12, large stocks of pig iron, some of them quite ancient, were being drawn upon. Should the market continue to decline in the next few months there would not be time for similar stocks to accumulate. As to furnaces running at a loss, this may occur again, but the probability is against such a course being as common as it was at the last low point.

Sentimentally, the pig iron market prospects are relatively favorable. The promise is for heavy consumption. At the last low point there were not similar prospects. The trade had had only one rise since 1907 and that was the ill-starred one of 1909, which in the minds of men in the winter of 1911-12 was a deterrent rather than an encouragement. To-day, on the other hand, memory is fresh of an experience that a legitimate demand can really strain the productive capacity of the steel works and steel works furnaces as well as of all the better positioned merchant furnaces.

Steel Earnings and Flood Losses

Net earnings of \$34,426,000 by the Steel Corporation in the first quarter of this year represent about three-quarters of a million dollars falling off from the last quarter of 1912, for which they were \$35,185,000. In favor of the expectation of larger earnings in the March quarter was the assumption that the shipments in that period carried higher average prices than those in the preceding quarter. On the other side, counting in holidays, some of which were work days at most steel plants, there were 77 working days in the first quarter against 79 in the last quarter. There was also the increase in wages dating from February 1 which has been estimated at \$1,000,000 a month. Allowance must also be made for the loss of earnings in March due to the Central Western floods. It is not easy to appraise this last factor, which also must be considered in connection with earnings for April. While details are not given out, so far as the losses of individual companies are concerned, a computation has been made by steel manufacturers, which puts the total loss of steel production directly and indirectly due to the floods at 350,000 tons of ingots. This is based not only on the time plants in the flooded district were

out of commission or were running at less than their usual rate, but also upon the known reduction in output in other districts because of short coke supply which cut down pig-iron output. Thus the loss of profits to the various steel companies involved, which is traceable to the floods, will fall between \$2,000,000 and \$2,500,000. To labor at iron mines, coke ovens, blast furnaces, quarries and coal mines and on railroads the cost of the flood in wages is a good many millions more, for, as truly as in destruction by earthquake, fire or any other calamity, the loss is one that cannot be made up.

Considering the \$1,500,000 to \$2,000,000 increase in wage payments in the last quarter and the share of tonnage losses from the flood borne by its plants in the Wheeling, Valley and other districts, the close approach of the Steel Corporation's January-March earnings to those of October-December indicates a fair rise in the average of prices on shipments—a condition applicable also to the independent steel companies, most of which were exempt from severe loss by flood and some of which have not taken on proportionately as large an added burden in wage advances.

Hunger and Shop Efficiency

The question has been raised whether industrial efficiency would be increased by giving employees a few minutes in the middle of each half day, especially in the morning, in which to take light nourishment, particularly where the working force is made up largely of young people. With the ordinary 9-hour or 10-hour day, the work begins at 7 o'clock and continues without interruption until noon. Many employees are ill nourished. They may get only a light breakfast, and a large proportion of them may live at a distance from their work, compelling them to finish their morning meal at 6 o'clock or shortly afterward. They must go then six hours without food.

In this connection an interesting test has been made in the stenographic department of a large industrial plant. The young women begin their morning work at 8.30 o'clock. It was found from corroborated observation that the efficiency of the operators fell off as the morning progressed. When informed of this condition they seemed unable to correct it. Finally the management determined to give them a 10-minute recess at 10.30 o'clock, and serve them with hot bouillon. The results have amply justified the loss of time and the slight expense. The intermission has been more than made up for by the increased production in the interval preceding the lunch hour. The operators, rested and stimulated, work with new vigor.

The same condition of lassitude resulting from hunger must occur in manufacturing departments. Many of the employees are young. Boys of the apprentice age require a good deal of nourishing food if they are to be strong in their maturity. Few children are employed in the metal industries, but in some factories where the labor is light the percentage of young men and women employees is high. The adult, too, must have a sufficiency of food at the right time. Some men actually suffer if they are compelled to endure too long intervals between meals. It is a well-established fact that home conditions of workmen are frequently not all that could be desired, and that breakfast is a wholly inadequate meal. Naturally,

under such conditions, the efforts of employees may lag, with decreasing vitality resulting from the exhaustion of what may be called their fuel supply. To be sure, some may snatch a moment to eat a little in working hours, but many of them do not, and the custom is discouraged by many foremen and superintendents. The suggestion has been made that employees be given regularly a few minutes for eating in the middle of each half day. When working hours were longer this practice was very general in this country, as it is now in Germany, but it has died out here as the result of the shortened industrial day. The idea may be altruistic that owners serve their people with bouillon or other nourishment. Yet it might be shown that the stimulation to greater effort would result in a very profitable enlargement of output. At the same time, the health of employees would be improved and the number of idle hours from sickness noticeably reduced.

The Systematic Inspection of Machinery

Systematic investigation of conditions in manufacturing plants usually shows a great difference between departments in regard to the care of machinery. While many foremen are very particular that the equipment under their control is maintained in the best condition, others are much less careful. The difference in degree of depreciation is therefore marked, and the efficiency of one department must fall below that of another, because the ill-kept machine will not produce up to its standard of results. Occasionally the case arises of a foreman who crowds machines without giving proper attention to the tools which they use, thus placing upon them a burden which is abnormal, though the speeds and feeds employed would be wholly proper were the work carried on scientifically.

In one works which uses large numbers of machine tools a system of getting at information such as this revealed pronounced inequalities as between the foremen, and it was determined to check up all departments with periodic inspections under the direction of a practical mechanical expert. This is another example of the value of centralized authority. If a department is continually expecting a call from the inspector of machinery, the workmen as well as the foremen are apt to see that they are not caught with dull tools or unoiled moving parts or found lacking in cleanly care. Naturally the inspection develops cases where a machine is used too carefully, so that its product is below the standard of practice, which constitutes another evil in the directing of machinery operations. In any case the system should pay a large return as compared with the cost of its maintenance.

Coal exports from the United States in the current fiscal year will approximate \$90,000,000 value, against \$60,000,000 in 1909. These figures include the coal and coke exported to foreign countries and the coal supplied to vessels engaged in the foreign trade. Canada is by far the largest purchaser. Practically all of the anthracite coal passing out of the United States goes to Canada, while over \$20,000,000 worth of the \$27,000,000 value of bituminous coal exported in the current fiscal year also went to that country. Cuba, other West Indies, Panama and Mexico are, in the order named, the next largest takers of bituminous coal. The United States stands third in the list of coal-exporting nations, though at the head of the world's coal producers.

United States Steel Corporation's Earnings

Surplus for the March Quarter \$7,369,600

The statement of the United States Steel Corporation's earnings for the quarter ended March 31, 1913, makes the following excellent showing, as compared with the corresponding period of 1912, with its deficit of \$6,292,134:

	1913	1912
January	\$11,342,533	\$5,243,406
February	10,830,051	5,427,320
March	12,254,217	7,156,247
Total after deducting all expenses incident to operations, including those for ordinary repairs and maintenance of plants, and interest on bonds of the subsidiary companies	\$34,426,801	\$17,826,973
Less charges and appropriations for the following purposes:		
Sinking funds on bonds of subsidiary companies and depreciation and replacement funds	7,086,539	4,148,444
Sinking funds on U. S. Steel Corporation bonds:		
Installments	1,012,500	1,012,500
Interest on bonds in sinking funds.....	631,253	557,614
Net earnings	\$25,696,509	\$12,108,415
Deduct interest for the quarter on U. S. Steel Corporation bonds outstanding....	5,668,209	5,741,849
Balance	\$20,028,300	\$6,366,566
Dividends for the quarter:		
Preferred, 1 3/4 per cent.....	6,304,919	6,304,919
Common, 1 3/4 per cent.....	6,353,781	6,353,781
Surplus for the quarter.....	\$7,369,600	
Deficit for the quarter.....		\$6,292,134
	Tons	Tons
Unfilled orders on hand, March 31.....	7,468,956	5,304,841

The earnings for the December quarter were \$35,185,557 and the surplus for that quarter was \$7,410,979.

New Blooming Mill at Bethlehem

For the new merchant-mill department which is under construction at its Lehigh plant, the Bethlehem Steel Company has just ordered from Mackintosh, Hemphill & Co., Pittsburgh, a 35-in. blooming mill, at the same time placing a contract with the Morgan Engineering Company, Alliance, Ohio, for rolling-mill tables, manipulators and shear. The blooming mill will be driven by a reversing motor, complete with flywheel, balance set, etc. The electrical equipment for this purpose has not yet been bought. To provide the additional electric power required for driving the various merchant mills the Bethlehem Steel Company is building the necessary gas engines and has purchased three 2500-kw. generators from the General Electric Company.

The new blooming mill will be located on the property purchased some time ago from the New Jersey Zinc Company, comprising 12 acres immediately adjoining the western end of the Bethlehem works.

Larger Quarters for the Merchants' Association

The Merchants' Association of New York has moved into its new offices in the Woolworth Building, 233 Broadway, New York City, its old quarters at 54-60 Lafayette street having been outgrown. In its new location it occupies the greater part of the ninth floor of the building, and the space taken affords ample accommodations for the many activities of the association.

Organized in the heart of the wholesale dry goods district in 1898, concurrently with the creation of Greater New York by the annexation of Brooklyn, Queens and Richmond, the association has grown until it now has upward of 3300 members. Among them are numbered not only leading merchants and manufacturers of the city, but also the representative firms, corporations and individuals in practically every field of business and professional life in the five boroughs.

The new headquarters are so situated as to be easily reached by the various transit routes, and are therefore convenient of access for members of the association and for visiting merchants from other cities. They contain a large assembly room for meetings of the members, a reference library, rooms for the officers and directors and separate rooms for the industrial, traffic, publicity, membership and convention bureaus which have recently been organized by the association.

Mining Engineers' Iron and Steel Committee

The following Iron and Steel Committee has been appointed by the American Institute of Mining Engineers to serve until the next annual meeting: Charles Kirchhoff, chairman; Albert Sauveur, vice-chairman; Herbert M. Boylston, secretary, Abbot Building, Harvard square, Cambridge, Mass.; John Birkinbine, William H. Blauvelt, James Gayley, Henry D. Hibbard, Henry M. Howe, Robert W. Hunt, J. Esrey Johnson, Jr., William Kelly, Richard Moldenke, Joseph W. Richards, A. A. Stevenson, Felix A. Vogel, Leonard Waldo, William R. Walker, William R. Webster, Frederick W. Wood.

It will be noted that the various interests of the iron and steel industry are authoritatively represented on this committee by producers of raw materials (iron ore, coke and other fuels, refractories, etc.) and of finished materials, by consumers, consulting metallurgists and educators.

The primary duties of the committee are to secure important papers on iron and steel, to promote their discussion, to organize lively and fruitful meetings and otherwise to foster the interests of the large number of members of the Institute connected with the iron and steel industry in its many phases. Its success the past year has been noteworthy. Through its instrumentality many valuable papers were presented at the Cleveland and New York meetings, followed by animated and productive discussions, while the attendance of iron and steel men at both meetings was remarkably large and representative.

Since the next meeting of the Institute is to be held in a Western mining district far remote from iron and steel centers, plans are now being made for a meeting in a more accessible place in the latter part of October under the auspices of the Iron and Steel Committee to be devoted to the presentation and discussion of papers relating to iron and steel. Arrangements are under way and even at this early date the indications point to a successful meeting. Efforts will be made to secure important papers covering the four divisions into which the industry may be classified, namely:

1. Mining and preparation of ores including concentrating, nodulizing, sintering, briquetting, etc.; manufacture of coke and other fuels and refractory materials.
2. Manufacture of pig iron, including blast furnace construction and appliances.
3. Manufacture of wrought iron and steel, including mill construction and appliances.
4. Manufacture of finished products of cast iron, steel and wrought iron, including testing, heat treatment and metallography.

Bethlehem Purchase of Fore River Shipyard

Announcement is made of the purchase of the Fore River Shipbuilding Company, Quincy, Mass., by the Bethlehem Steel Corporation, putting the latter in the position of being able to compete in the construction of warships as well as the other types of vessels it now builds. The yard at Quincy will therefore furnish an outlet for a certain amount of the Bethlehem Steel Company's output of armor plate, structural shapes, forgings, ordnance, etc.

The terms of the purchase are indicated in a letter sent by the directors and a stockholders' committee to the holders of Fore River company shares. It says that the Bethlehem Steel Corporation takes the plant and other assets of the shipbuilding company, including good will, and assumes its contracts and liabilities. In return the Bethlehem company "pays \$600,000 in first lien and refunding 5 per cent. mortgage bonds due in 1942, of the Bethlehem Steel Company. The committee is to purchase and arrange the sale of \$750,000 of first mortgage 20-year 5 per cent. bonds, a lien on the present property, as issued by a new Massachusetts corporation, said bonds being guaranteed principal and interest by the Bethlehem Steel Company."

The Fore River Shipbuilding Company has outstanding \$2,400,000 of preferred and the same amount of common stock. It has no bonded debt and is reported to have kept free of bank loans. The outlook for dividends, as is well known, is remote and the stockholders have therefore been willing to sell at considerably below par. It is stated that Admiral Bowles will remain in charge of the property. A new dry dock is reported to be projected.

American Iron and Steel Institute

In announcing the fourth general meeting of the American Iron and Steel Institute, to be held at the Waldorf-Astoria, New York, Friday and Saturday, May 23 and 24, Secretary McCleary states that on Friday there will be three sessions. That of the morning will be devoted to business topics and that of the afternoon to operating and metallurgical questions, while the evening programme in connection with the banquet will deal with welfare work.

The following is a tentative list of the papers to be read at the meeting:

- "Transportation of Bulk Material on the Great Lakes." By H. Coulby, Cleveland, president Pittsburgh Steamship Company. Discussion opened by A. C. Pessano, president Great Lakes Engineering Works, Detroit.
- "In What Direction is Education Tending in the Training of Men for the Technical Professions? Is It Toward Specialization or Toward Grounding in the Broader Sciences?" By Prof. Frederick Crabtree, Pittsburgh, Carnegie Technical Institute. Discussion opened by Wm. Whigham, assistant to the president Carnegie Steel Company, Pittsburgh.
- "By-Product Coke Ovens." By C. A. Meissner, New York, United States Steel Corporation. Discussion opened by W. H. Blauvelt, Semet-Solway Company, Syracuse, N. Y.
- "Ore Reserves in the Eastern Mesaba Range." By Geo. A. St. Clair, Duluth, Minn. Discussion opened by Sheldon Norton, Witherbee, Sherman & Co., Mineville, N. Y.
- "Gas Engines." By H. J. Freyn, Allis-Chalmers Mfg. Company, Milwaukee. Discussion opened by Arthur West, Bethlehem Steel Company.
- "The Practical Value of the Microscope in the Steel Industry." By Prof. Albert Sauveur, Harvard University, Cambridge, Mass.
- "Claims and Their Adjustment." By Geo. P. Early, American Sheet & Tin Plate Company, Pittsburgh.
- "The Importance of First Aid to the Injured." By Dr. William O'Neill Sherman, chief surgeon Carnegie Steel Company, Pittsburgh. Discussion opened by Dr. John B. Lowman, Cambria Steel Company, Johnstown, Pa.
- "What Causes Fatigue?" By Dr. Thomas Darlington, secretary Welfare Committee, American Iron and Steel Institute.

The following were elected to membership at a directors' meeting held April 25:

- George H. Blakeley, Bethlehem Steel Company, South Bethlehem, Pa.
- Robert W. Campbell, Illinois Steel Company, Chicago.
- Rollin K. Cheney, Sweet's Steel Company, Williamsport, Pa.
- Lorenzo C. Dilks, Eastern Steel Company, 60 Broadway, New York.
- Lewis E. Dunham, M. A. Hanna & Co., Cleveland.
- Wm. Alexander Forbes, United States Steel Corporation, 71 Broadway, New York.
- John W. Hamilton, 29 Broadway, New York.
- Mark A. Hanna, M. A. Hanna & Co., Cleveland.
- Charles Heggie, Scully Steel & Iron Company, Chicago.
- Arthur S. Hook, Calumet Steel Company, Chicago.
- Harold L. Hughes, United States Steel Products Company, 30 Church Street, New York.
- Ernest Humbert, 71 Broadway, New York.
- G. B. LeVan, La Belle Iron Works, Steubenville, Ohio.
- John B. Lowman, M.D., Cambria Steel Company, Johnstown, Pa.
- Austin D. Mixsell, Bethlehem Steel Company, South Bethlehem, Pa.
- N. G. Petinot, Titanium Alloy Mfg. Company, Niagara Falls, N. Y.
- R. C. Phillips, American Rolling Mill Company, Middletown, Ohio.
- John H. Porter, Calumet Steel Company, Chicago.
- George A. St. Clair, Duluth, Minn.
- John N. Reese, Republic Iron & Steel Company, Youngstown, Ohio.
- Sheldon Norton, Witherbee, Sherman & Co., Mineville, N. Y.
- Heinrich J. Freyn, Allis-Chalmers Mfg. Company, Milwaukee, Wis.
- Selwyn C. Edgar, Edgar Zinc Company, St. Louis.

The annual meeting of the Manufacturers' Association of Bridgeport, Conn., was held on the evening of April 23, with a large attendance. The officers elected were: President, L. B. Curtis, Curtis & Curtis Company; first vice-president, E. F. Russell, Locomobile Company of America; second vice-president, James G. Ludlum, International Silver Company, factory C; treasurer, A. J. Bruff, Remington Arms-Union Metallic Cartridge Company.

The next meeting of the American Electrochemical Society will be held in Denver, Col., September 8, 9 and 10.

British Iron and Steel Exports Decline

A shrinkage in British iron and steel exports is reported for the first quarter of this year as compared with 1912. Excluding scrap the total of iron and steel sent abroad was 1,175,691 tons as against 1,287,091 tons in 1912, a decrease of 111,400 tons. This is partly explained by the fact that there were more working days in the 1912 quarter than in that of this year. On the other hand values show a large increase. The total value of iron and steel exports in the first quarter of 1912 was £12,339,000 as compared with £13,321,000 for this year's quarter in spite of the decreased tonnage. An increase in exports is shown only in galvanized sheets, hoops and strips, and chairs and sleepers, the improvement in sheets, being due to better trade with India. The decrease in pig iron was 79,000 tons, due to a falling off in trade with Germany, Italy and Japan; in rails 14,500 tons, due to the smaller tonnage sent to India; in tin-plates 14,000 tons, due to the unsettled trade with Roumania because of the Balkan war.

The import figures for the same quarter show a considerable advance over 1912. Iron ore imported was 2,042,000 tons as against 1,610,000 tons in 1912 and 1,800,000 tons in 1911. In semi-finished steel and manufactured products the total was 583,000 tons, against 450,000 tons last year and 446,000 tons in 1911.

The Machine Tool Builders' Spring Meeting

The spring meeting of the National Machine Tool Builders' Association will be held at the Hotel Astor, New York, Thursday and Friday, May 15 and 16. The programme is not completed, but it has been decided that the proceedings will follow the idea as expressed at the annual meeting last fall, namely, that the sessions be given up entirely to business. Sessions on Thursday and Friday morning will consist of meetings of the various committees representing the several divisions of the industry, while an association meeting will be held Friday afternoon at which matters of general interest will be taken up. In previous years the spring meetings have been held at Atlantic City or other similar resorts, and the change to New York City is a departure from the custom.

The Woolworth Building, Broadway and Park place, New York, was formally opened on the evening of April 24. This is the second tallest structure in the world, being surpassed only by the Eiffel Tower in Paris. It is 55 stories high, and the top of the tower is 792 ft. above the street. The building is unique in being owned by one man, Frank W. Woolworth, who erected it at a cost of \$13,500,000. His success had its beginning in the investment of small savings in the establishment of a store to sell articles for 5 and 10 cents each. The architect was Cass Gilbert, and Louis J. Horowitz was the builder. A statement by the architect, published in the New York Times, April 25, says that the building stands to-day without a mortgage on it or a dollar of indebtedness.

The eighth annual convention of the Federation of Trade Press Associations will be held at the Hotel Astor, New York, September 18 to 20, 1913. The president of this organization is H. M. Swetland, of the Automobile, New York; vice-president, Elmer C. Hole, American Lumberman, Chicago; secretary and treasurer, Edwin C. Johnston, American Exporter, New York. The associations united in this organization are the New York Trade Press Association, New England Trade Press Association, St. Louis-Southwestern Trade Press Association, Chicago Trade Press Association, Philadelphia Trade Press Association and other unaffiliated publications.

Manufacturers of Racine, Wis., figuring mainly in the production of machinery, automobiles, agricultural implements and varied castings, are making arrangements for an exposition to be held from June 2 to 7 inclusive, which is designed to make the world better acquainted with Racine products. The J. I. Case Threshing Machine Company has consented to give the use of its new foundry and machine shop unit at Lakeside, now being completed at a cost of more than \$1,150,000, for housing the exhibits, and 120,000 sq. ft. of floor space will be available. The show is in charge of the commerce and manufactures committee of the Racine Commercial Club.

C.I.F. Foreign Business Quotations*

Present Trade Efforts Under F.O.B. Price Inefficient—C.I.F. Agreements Reduce Risk and Time

—BY A. M. FISHER—

The advantages of the c.i.f. quotation, signifying cost, insurance and freight, are recognized by those who do the largest foreign business. I have been a manufacturer, having several years' practical experience in metal working lines. Through that experience I learned more or less of the export problems as presented to the manufacturer, then and now, of the various effective and ineffective schemes constantly offered by theorists in the export field, and of methods which have been thoroughly successful during the past 20 years. I have also been in the foreign market for several years selling machinery and other American lines of goods, and was successful in contributing largely to the increased use of American machinery in the shops of Japan.

Why C.I.F. Quotations Increase Trade

The world, or at least our part of it, is talking efficiency. The c.i.f. quotation is advantageous and desirable because it is more efficient than the usual quotation f.o.b. shipping point. There are several reasons.

It is well to understand the difference between the c.i.f. price and the f.o.b. price, and also to understand the differences as to risk. A c.i.f. price, quoted for a foreign port, includes the cost of the goods f.o.b. steamer, the marine insurance charges and the steamer transportation charges to the foreign port in accordance with the terms of the bill of lading.

An f.o.b. price is understood to be a price at point of sale unless stipulated otherwise. By stipulation it may of course be effective at any point nominated. C.i.f. London and f.o.b. London are two very different matters so far as risk is concerned. The f.o.b. quotation as a rule includes all of the risks of the c.i.f. quotation, and, in addition, covers other risks. A quotation f.o.b. New York, as opposed to a quotation c.i.f. London on a shipment destined to London, will, as a rule, in practice, involve more risk than the c.i.f. quotation.

With the c.i.f. price no liability is involved beyond the cost of the goods and the prepayment of the insurance and freight charges. These prepayments are not mandatory, however, if the amounts are allowed to be deducted. With the c.i.f. quotation damage or loss after shipment does not accrue in any way against the shipper, save on proof of negligence, which, of course, is not voided.

With the f.o.b. price all liabilities are with the shipper until delivery is made in accordance with the quotation stipulation. If the stipulation covers delivery at a foreign port the risk is considerable. If it covers delivery at point of shipment it practically amounts to the same thing as a c.i.f. price in view of the usual practice of the steamship companies and insurance companies to require prepayment of charges.

The Fundamentals of C.I.F. Quotations

The elements of the c.i.f. price have been suggested, but elaborated they will fairly be covered by the following:

As to cost: The price of the goods f.o.b. steamer, including initial factory price, rail carriage to port of shipment, trucking or lightering to steamer, derrick charges or lifting into steamer if extra heavy or bulky, charges due to special hazards, probable storage charges at port of shipment, drawback, if any, consular charges, petties and postage.

As to insurance: The premium charge covering a nominated period of time, perhaps both before and after the voyage.

As to freight: All steamer charges covering shipment to destination in accordance with the terms of the bill of lading and the customary practices of the outward port as to the interpretation put upon the terms of the bill of lading.

Detailed Information Not Obtainable by Foreign Merchants

I have said that the c.i.f. price is more efficient than the f.o.b. price made at the lading port, as is usually done. This you will readily understand when you consider

the condition at the foreign port and also the logic as to the seller's obligations.

As to the cost: The foreign buyer, if quoted at the factory, has no means of knowing the cost of rail or domestic carriage. If quoted f.o.b. cars port of shipment the foreign buyer has no means, except perhaps some bitter experiences, which enable him to know or judge as to the charges for such matter as trucking, lighterage, derrick or lifting, hazards, storage, drawback, consular requirements, to say nothing of petties and postage.

As to insurance: He has no means of knowing the insurance rates nor the premium amounts owing to a lack of knowledge of other elements, and

As to freight: He is, as a rule, unable to obtain a quotation of an outward freight rate at an inward port. That is, the steamship quotation will not be given in Melbourne from New York, but will be referred to New York. This is a general practice with the steamship companies. They publish no tariffs as do our domestic common carriers.

Also, manufacturers frequently make serious errors in stating the gross weight, net weight, legal weight and the cubic measurement of their products. This, of course, is an essential piece of information in figuring laid down costs in foreign markets. In many cases the American manufacturers give no information related to this important matter, although they believe themselves to be making serious efforts toward a development of their export trade.

It has come within my experience to see errors of over 100 per cent., as to weights and measurements, and substantial differences were frequent enough to inspire profanity.

It is a practical waste of time to make quotations of any sort unless some idea, within safe limits, is given as to weights and measurements.

Vital Information Readily Obtained in This Country

The difficulties incident to the making of c.i.f. prices are not so great as many manufacturers believe. In the making of the c.i.f. price there are two predominant items, namely, the cost f.o.b. steamer and the freight charges.

With some exceptions, the price f.o.b. steamer on a given article will be the same irrespective of the port of destination. So that if the price f.o.b. steamer has been made it is a simple matter to add the freight and insurance charges to this uniform base, according to the rates and charges quoted for different ports. Freight rates seldom vary as much as five shillings per ton, and compared with the value of the articles quoted, if specialties, will affect a c.i.f. price less than 5 per cent., and in many cases not a half of 1 per cent. The manufacturer's selling risk is a great deal more than this in ordinary domestic transactions. A difference of \$1.25 in the expense account related to a \$100 sale is seldom a cause for serious worry in domestic selling efforts.

Then, too, the transportation cost on specialties is a small percentage of the value of the shipment. Such a line as leather belting can be shipped all over the world for less than 5 per cent. of its f.o.b. cost. Machinery, that is machine tools, will ordinarily not figure over from 5 per cent. to 8 per cent. of the f.o.b. cost. So it is with light hardware and mechanics' tools; their value runs very high compared with the transportation costs.

The difficulty incident to quoting c.i.f. grows as the percentage relation of the freight charges to the cost of the goods increases. By this relation and the importance of fluctuations it must be decided whether it is safe to quote c.i.f. by due course of mails or by cable.

The American business man interested in export cannot fail to appreciate the logical advantages of quoting c.i.f. prices, especially if the tables are turned. Consider a quotation made to a merchant in Cincinnati by a seller in Budapest, stipulating f.o.b. Budapest. I doubt if there is a man present who would be willing to tackle the making of a statement of cost at Cincinnati when he found that the essentials could be learned only in Budapest.

A general move in the direction of quoting c.i.f. prices would, I believe, enhance the volume of foreign trade from this country, and also prevent much of the abortive attempts to secure export business on the part of the American manufacturers, preventing the enormous waste incident to present methods.

*From an address before the American Manufacturers' Export Association.

The Iron and Metal Markets

Conservatism in Buying

Premiums Lessening or Disappearing

Pig-Iron Prices Stationary or Lower, with Contracts Still Deferred

The greater caution of buyers of iron and steel is more a matter of comment as the season of active outdoor operations advances. In respect to steel products this is not surprising, seeing how far ahead many consumers are committed; but it signifies that the remarkable forward buying of 1912 will probably not be repeated. As applied to pig iron it is construed in some quarters to mean that when contracting is resumed it will not be for as long periods as were covered by purchases in the second half of last year.

Our reports from steel centers agree that the situation in structural shapes has eased up, with premiums disappearing, also that sheet prices are lower, galvanized selling about \$2 a ton less and black sheets \$1 a ton less than the recent basis of 3.50c. for No. 28 galvanized and 2.35c. for black. New sheet capacity is bidding for its share of the business.

In the East 1.45c., Pittsburgh, for large structural sections has been quoted on second-quarter delivery as against a very recent minimum of 1.50c. The complaint of fabricators that there is needless cutting in their business is intermittently stronger. Flood repair and reconstruction work, so far as heard from, is somewhat above 10,000 tons.

The lessening of premiums on plates is reported in the Central West, but Eastern mills must still be called upon where early deliveries are required, and with them 1.60c., Pittsburgh, is a common price for both sheared and universal plates, though 1.50c. is reported to have been done for second quarter. The Government is taking bids for 7500 to 8000 tons of plates and shapes for two tenders for submarines.

Financing details are holding back car business both in New England and the South. The latest inquiry is for 5000 cars for the Erie, making a total of about 20,000 pending. The Grand Trunk has placed 2000 cars with the new Eastern Car Company, New Glasgow, Nova Scotia.

More bar contracts run over into 1914, particularly with implement makers, than reviews of that market have generally indicated, and makers have held to 1.40c., Pittsburgh. In Eastern markets bar-iron prices are easier, and premiums for early shipment of both iron and steel bars are smaller. In bars for concrete reinforcement a large business has been done at Pittsburgh and Chicago.

Billet and sheet-bar mills in the Central West are back to their rate of production before the floods and offerings for early delivery are larger, particularly by one interest. On the other hand one Buffalo mill has been closed down by a strike.

Pig-iron prices are stationary in some districts and weaker in others. That consumption has not fallen away is strongly urged by sellers in support of the belief that a turn is not far off, but the foundry trade is talking conservatively and making no haste to provide for the second half.

St. Louis has been relatively more active than other markets, with sales amounting to 20,000 tons, much of it to stove works. It is intimated that \$12, Birmingham, was not bottom in these sales.

In eastern Pennsylvania sales to cast-iron pipe works have been made at \$16 and \$16.25 delivered. Sales and resales of Virginia iron have developed prices in line with a \$14.50 basis for No. 2 X.

Northern and southern Ohio makers have been in sharper competition as the market has declined, and \$15 at Lake front furnace has been met by \$15.50 at the Ohio River. But \$15 at Valley furnace has brought out very little business.

A large purchase of Southern iron by a harvesting machinery interest is both affirmed and technically denied. The contracts of this company have long been hedged about by secrecy and are therefore not the market factor they once were. In the present case, if there was a transaction, the market has not been responsive.

In cast-iron pipe lower prices are coming out as pig iron declines, and there is a scramble for the New York City contract calling for 11,000 tons. Meriden, Conn., opens bids May 1 for 4000 tons.

The scrap market has declined further at Chicago, Cincinnati, Pittsburgh and Philadelphia, in both steel works and foundry grades. The large accumulations of the railroads, and one line in particular, have made the outlook at Chicago especially unfavorable.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics

At date, one week, one month, and one year previous.					
	May 1, 1913.	Apr. 23, 1913.	Apr. 2, 1913.	May 1, 1912.	
Pig Iron, Per Gross Ton:					
Foundry No. 2 X, Philadelphia.	\$17.00	\$17.25	\$17.75	\$15.10	
Foundry No. 2, Valley furnace.	15.00	15.25	16.00	13.25	
Foundry No. 2 S't'h'n, Cin'ti...	15.25	15.25	16.25	14.00	
Foundry No. 2, Birmingham, Ala.	12.00	12.00	13.00	10.75	
Foundry No. 2, furnace, Chicago*	16.75	16.75	17.25	14.50	
Basic, delivered, eastern Pa....	16.50	16.50	17.00	15.25	
Basic, Valley furnace.....	15.75	15.75	16.00	13.00	
Bessemer, Pittsburgh.....	17.90	17.90	17.90	15.05	
Malleable Bessemer, Chicago*..	16.75	16.75	17.25	14.00	
Gray forge, Pittsburgh.....	15.40	15.65	16.75	13.65	
Lake Superior charcoal, Chicago	18.00	18.00	18.00	15.75	
Billets, etc. Per Gross Ton:					
Bessemer billets, Pittsburgh....	28.50	28.50	28.50	20.50	
Open-hearth billets, Pittsburgh.	29.00	29.00	29.00	20.00	
Forging billets, Pittsburgh....	36.00	36.00	36.00	27.00	
Open-hearth billets, Philadelphia	29.00	30.00	30.00	23.40	
Wire rods, Pittsburgh.....	30.00	30.00	30.00	25.00	
Old Material, Per Gross Ton*					
Iron rails, Chicago.....	16.00	16.00	16.25	16.00	
Iron rails, Philadelphia.....	18.00	18.00	18.00	16.50	
Carwheels, Chicago.....	16.75	16.75	16.75	13.50	
Carwheels, Philadelphia.....	14.25	14.50	15.00	13.50	
Heavy steel scrap, Pittsburgh...	14.00	14.00	14.25	13.25	
Heavy steel scrap, Chicago....	12.00	12.50	12.50	11.75	
Heavy steel scrap, Philadelphia..	12.50	13.00	13.75	13.50	
Finished Iron and Steel,					
Per Pound to Large Buyers:					
Bessemer rails, heavy, at mill...	1.25	1.25	1.25	1.25	
Iron bars, Philadelphia.....	1.57½	1.57½	1.67½	1.30	
Iron bars, Pittsburgh.....	1.70	1.70	1.70	1.25	
Iron bars, Chicago.....	1.57½	1.57½	1.57½	1.17½	
Steel bars, Pittsburgh, future..	1.40	1.40	1.40	1.20	
Steel bars, Pittsburgh, prompt..	1.80	1.85	1.85	1.30	
Steel bars, New York, future..	1.56	1.56	1.56	1.36	
Steel bars, New York, prompt..	1.96	2.01	2.01	1.36	
Tank plates, Pittsburgh, future..	1.45	1.45	1.45	1.25	
Tank plates, Pittsburgh, prompt..	1.60	1.70	1.70	1.25	
Tank plates, New York, future	1.61	1.61	1.61	1.41	
Tank plates, New York, prompt	1.76	1.76	1.76	1.41	
Beams, Pittsburgh, future.....	1.45	1.45	1.45	1.25	
Beams, Pittsburgh, prompt.....	1.60	1.70	1.70	1.25	
Beams, New York, future.....	1.61	1.61	1.61	1.36	
Beams, New York, prompt.....	1.71	1.71	1.76	1.36	
Angles, Pittsburgh, future.....	1.45	1.45	1.45	1.25	
Angles, Pittsburgh, prompt.....	1.60	1.70	1.70	1.25	
Angles, New York, future.....	1.61	1.61	1.61	1.36	
Angles, New York, prompt.....	1.71	1.71	1.76	1.36	
Skelp, grooved steel, Pittsburgh.	1.45	1.45	1.45	1.15	
Skelp, sheared steel, Pittsburgh.	1.50	1.50	1.50	1.20	
Steel hoops, Pittsburgh.....	1.60	1.60	1.60	1.25	

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Pound to Large Buyers:	May 1, 1913.	Apr. 23, 1913.	Apr. 2, 1913.	May 1, 1912.
	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.35	2.35	2.35	1.90
Wire nails, Pittsburgh	1.80	1.80	1.80	1.60
Cut nails, f.o.b. Eastern mills	1.80	1.80	1.80	1.55
Cut nails, Pittsburgh	1.70	1.70	1.70	1.40
Fence wire, ann'd, 0 to 9, Pgh.	1.60	1.60	1.60	1.90
Barb wire, galv., Pittsburgh	2.20	2.20	2.20	

Coke, Connellsville, Per Net Ton, at Oven:				
Furnace coke, prompt shipment	\$2.00	\$2.25	\$2.25	\$2.50
Furnace coke, future delivery	2.25	2.25	2.25	2.25
Foundry coke, prompt shipment	3.00	3.00	3.00	2.75
Foundry coke, future delivery	3.00	3.00	3.00	2.65

Metals, Per Pound to Large Buyers:				
Lake copper, New York	15.75	15.75	15.37½	16.00
Electrolytic copper, New York	15.62½	15.62½	15.12½	15.87½
Spelter, St. Louis	5.45	5.45	5.75	6.75
Spelter, New York	5.60	5.60	5.90	6.90
Lead, St. Louis	4.37½	4.37½	4.20	4.07½
Lead, New York	4.50	4.50	4.35	4.20
Tin, New York	40.87½	49.75	48.00	46.37½
Antimony Hallett New York	8.12½	8.50	8.50	7.62½
Tin plate 100 lb. box Pittsburgh	\$3.60	\$3.60	\$3.60	3.30

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.45c. to 1.60c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft., down to the weight of 3-16 in., take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 2.	.15
Gauges under No. 8 to and including No. 9.	.25
Gauges under No. 9 to and including No. 10.	.30
Gauges under No. 10 to and including No. 12.	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft., to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and tees, 3 in. and over, 1.45c. to 1.60c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in. on one or both legs	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, hand rail, car-truck and conductor rail)	.05
Angles, channels and tees, under 3 in. wide as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft., to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

Wire Rods and Wire.—Bessemer, open-hearth and chain rods, \$30. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.60; galvanized, \$2. Galvanized barb wire, to jobbers, \$2.20; painted, \$1.80. Wire nails, to jobbers, \$1.80.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

		Plain Wire, per 100 lb.							
Nos.		0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	...	\$1.75	\$1.80	\$1.85	\$1.90	\$2.00	\$2.10	\$2.20	\$2.30
Galvanized	...	2.15	2.20	2.25	2.30	2.40	2.50	2.90	3.00

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (full weight) in effect from April 12, 1913, iron pipe (full weight), from October 21, 1912:

		Butt Weld.			
Inches.	Steel.	Black.	Galv.	Inches.	Iron.
¾, 1 and 1½	72½	72½	52	¾ and 1	67
1½ to 2	76½	76½	66	1	66
2 to 3	79½	79½	71	1½	70
				2 to 2½	73

		Lap Weld.			
2	76½	68	1½	57	46
2½ to 6	78½	70	1½	68	57
7 to 12	75½	65	2	69	59
13 to 15	52½	—	2½ to 4	71	62
			4½ to 6	71	62
			7 to 12	69	56

		Plugged and Reamed.			
1 to 3, butt	77½	69	1 to 1½, butt	71	60
2, lap	74½	66	2, butt	72	61
2½ to 4, lap	76½	68	1½, lap	55	44
			1½, lap	66	55
			2, lap	67	57
			2½ to 4, lap	69	60

		Butt Weld, extra strong, plain ends.			
¾, 1 and 1½	67½	57	¾	64	53
1½ to 2	72½	66	1	68	61
2 to 3	76½	70	1½ to 2	72	63
			2 and 2½	73	64

		Lap Weld, extra strong, plain ends.			
2	73½	65	1½	66	60
2½ to 4	75½	67	2	67	59
4½ to 6	74½	66	2½ to 4	71	62
7 to 8	67½	57	4½ to 6	70	61
9 to 12	62½	52	7 and 8	64	54
			9 to 12	59	48

		Butt Weld, double extra strong, plain ends.			
¾	62½	56	1½	58	50
¾ to 1½	65½	59	¾ to 1½	61	53
2 to 2½	67½	61	2 and 2½	63	55

		Lap Weld, double extra strong, plain ends.			
2	63½	57	2	56	50
2½ to 4	65½	59	2½ to 4	61	55
4½ to 6	64½	58	4½ to 6	60	54
7 to 8	57½	47	7 to 8	53	43

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads on lap-welded steel, in effect from February 1, 1913, and standard charcoal-iron boiler tubes, in effect from January 1, 1913, are as follows:

Lap-Welded Steel.		Standard Charcoal Iron.	
1½ and 2 in.	60	1½ in.	44
2½ in.	57	1½ and 2 in.	48
2½ and 2¾ in.	63	2½ in.	44
3 and 3½ in.	68	2½ and 2¾ in.	53
3½ to 4½ in.	70	3 and 3½ in.	55
5 and 6 in.	63	3½ to 4½ in.	58
7 to 13 in.	60	Locomotive and steamship special grades bring higher prices.	

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2½ in. and larger, over 22 ft., 10 per cent. net extra. Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets.		Cents per lb.
Nos. 3 to 8		1.70
Nos. 9 and 10		1.75
Nos. 11 and 12		1.80
Nos. 13 and 14		1.85
Nos. 15 and 16		1.95

Box Annealed Sheets, Cold Rolled.		
Nos. 10 and 11		2.00
No. 12		2.00
Nos. 13 and 14		2.05
Nos. 15 and 16		2.10
Nos. 17 to 21		2.15
Nos. 22 and 24		2.20
Nos. 25 and 26		2.25
No. 27		2.30
No. 28		2.35
No. 29		2.40
No. 30		2.50

Galvanized Sheets of Black Sheet Gauge.

	Cents per lb.
Nos. 10 and 11	2.50
No. 12	2.60
Nos. 13 and 14	2.60
Nos. 15 and 16	2.75
Nos. 17 to 21	2.90
Nos. 22 and 24	3.05
Nos. 25 and 26	3.20
No. 27	3.35
No. 28	3.50
No. 29	3.65
No. 30	3.80

Pittsburgh

PITTSBURGH, PA., April 29, 1913.

In spite of the quietness which prevails in the steel business, actual specifications coming to the mills still represent from 75 to 80 per cent. of output, so that the situation might be a good deal worse. The mills have four to five months actual orders on their books, and if this material is specified for it means plenty of work for the next three months at least. Before that time shall have expired, the crop situation will be pretty well defined. Much of the hesitation now being manifested in the market is probably due to the proposed lower tariff on iron and steel products, consumers naturally going slow in making new engagements. The extreme weakness in pig iron is causing some apprehension as to whether it may extend to steel and finished material, but so far it has not done so. Prices on a few lines are weak, notably sheets, but this is due to the fact that some new capacity has recently come in the market and more is under way, these new concerns going after orders for sheets aggressively. The steel mills are still running to full capacity and shipments continue heavy. A notable feature of the market is that premiums for prompt deliveries of material, including plates, have about disappeared, indicating that regular sources of supply are making better deliveries to their customers. The market on coke and scrap is dull. Prices of scrap are steadily getting weaker. A Greek holiday in the coke trade last week caused nearly all the ovens to be idle for several days, and this made a material decrease in output. The general market is showing more stability in the face of the present quietness than was expected.

Pig Iron.—The market continues dull, not enough pig iron being sold to test prices. The last sale of basic in this market was 1500 tons to the Colonial Steel Company for second quarter, and this is reported to have gone at \$15.75. Valley furnace, but some reports have it that a lower price was made. Bessemer iron is stagnant, and while \$17, Valley furnace, is still the nominal market, offers to sell at a lower price were declined. No. 2 foundry is weak at \$15 and malleable Bessemer is close to that figure. The market is a waiting one, furnacemen knowing it to be useless to try to force sales under present conditions, while buyers are apparently satisfied to hold off until they need iron. Stocks at furnaces and in the yards of consumers are low, and with the present heavy rate of consumption are not likely to increase in the near future. In the absence of any recent actual sales on which to base prices, we make nominal quotations on pig iron as follows: Standard Bessemer, \$17; malleable, \$15; basic, \$15.75; gray forge, \$14.50, and No. 2 foundry, \$15, all at Valley furnace, with a freight rate of 90c. a ton for delivery in the Pittsburgh district.

Billets and Sheet Bars.—The steel mills continue to run to full capacity, and the output of Bessemer and open-hearth billets and sheet bars is probably as heavy now as before the recent floods. However, the offerings for prompt delivery are more frequent and premiums in prices for prompt shipment are disappearing to some extent. One leading steel mill outside the Pittsburgh district is offering Bessemer and open-hearth steel, promising fairly prompt delivery. There is little new inquiry. With the lowering in prices of pig iron, consumers who buy billets and sheet bars based on pig-iron prices are getting slightly cheaper steel. We quote nominally as follows: Bessemer billets, \$28.50 to \$29; Bessemer sheet bars, \$29 to \$29.50; open-hearth billets, \$29 to \$29.50; open-hearth sheet bars, \$29.50 to \$30, f.o.b. maker's mill, Pittsburgh or Youngstown. Forging billets, \$36 to \$37, and axle billets, \$34 to \$35, Pittsburgh.

Ferroalloys.—The market is extremely dull. English 80 per cent. ferromanganese, for either prompt or forward shipment, is still held at \$61, Baltimore, the new rate to Pittsburgh being \$2 a ton. On a firm offer, however, it is probable this price could be shaded. The demand for ferrosilicon is only for an occasional carload lot and full prices are being secured. We quote 50 per

cent. ferrosilicon, in lots up to 100 tons, at \$75; over 100 tons to 600 tons, \$74; over 600 tons, \$73, Pittsburgh. We quote 10 per cent. at \$24; 11 per cent., \$25; 12 per cent., \$26, f.o.b. cars at furnace, Jackson, Ohio, or Ashland, Ky. We quote ferro-carbon-titanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over; 12½c. in lots up to 2000 lb.

Wire Rods.—New inquiry is quiet, but consumers are specifying freely against contracts. We quote Bessemer, open hearth and chain rods, at \$30, Pittsburgh, but the market is none too strong at this price.

Muck Bar.—Prices are a shade easier, due to the weakness in pig iron, and best grades of local muck bar made from all pig iron can be had at not over \$30, Pittsburgh. Eastern muck bar made from all pig iron is being offered at about \$28, but no sales have been made in this market recently.

Skelp.—The recent advance of \$1 a ton in prices of steel pipe has not changed the market on skelp, but prices are firm. The skelp mills are sold up to July or longer, and consumers are taking out material promptly. A sale is reported of about 1000 tons of grooved iron skelp at 1.75c., delivered buyer's mill, Pittsburgh. We quote: Grooved steel skelp, 1.45c. to 1.50c.; sheared steel skelp, 1.50c. to 1.55c.; grooved iron skelp, 1.75c. to 1.80c.; sheared iron skelp, 1.85c. to 1.90c., delivered at buyers' mills in the Pittsburgh district.

Steel Rails.—Specifications against contracts for standard sections and also for light rails are coming in freely. The Carnegie Steel Company is sold up on Bessemer and open-hearth standard sections to July and on light rails to August. The demand for light rails continues fairly active, the same company having received in the past week new orders and specifications for about 3200 tons. We quote splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45-lb. sections, 1.25c.; 16 and 20 lb., 1.30c.; 12 and 14 lb., 1.35c., and 8 and 10 lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

Structural Material.—No important contracts have been placed. A new bridge project for McKees Rocks in this city is under way and if put through will take 5000 to 6000 tons. Offerings of shapes for prompt delivery are more plentiful and premiums are fast disappearing. It is said that the mills are making quicker deliveries to customers now than at any time for a good many months. We quote beams and channels up to 15 in. at 1.45c. to 1.50c. for delivery at convenience of the mill, which would be second half of this year, while small lots from warehouse for prompt delivery are bringing from 1.60c. up, depending on the size of the order and the deliveries wanted.

Plates.—No new orders for steel cars were placed in the past week, but the Baltimore & Ohio Railroad and the Atlantic Coast Line are in the market, each for 500 steel underframe freight cars. The United States Government is receiving bids for the material for two tenders for submarines, involving 7500 to 8000 tons of plates and shapes. It is probable that most of this business will go to Eastern mills, as local makers are not in position to give the deliveries wanted. Premiums on plates for prompt delivery are disappearing, and it is said that Eastern mills are offering plates at 1.50c. to 1.60c. in the Pittsburgh district for shipment in three to four weeks from the date of order. We quote ¼ in. and heavier tank plates at 1.45c., Pittsburgh, for forward delivery, while for shipment in three or four weeks 1.50c. to 1.60c. is being named for carloads and larger lots, small lots bringing 1.75c. and higher, all f.o.b. Pittsburgh.

Iron and Steel Bars.—A good many of the implement makers have already covered their requirements of steel bars for delivery over the last half of the year and in some cases these contracts call for deliveries in first half of 1914. It is expected that the contracts of the implement makers will be pretty well placed during May, and it is claimed that 1.40c., Pittsburgh, has been firmly maintained. The new demand for steel bars is fairly active and for concrete reinforcing bars is quite heavy, the mills being sold up for some months ahead and early deliveries are hard to secure. The steel bar mills have enough orders on their books to run to July or longer and have a good deal of actual business booked for third and fourth quarter delivery. The new demand for iron bars is fair but has been slowing up to some extent recently. We quote merchant steel bars at 1.40c. to 1.45c. for delivery at convenience of the mill, which would not be before third quarter, while for shipment from warehouses 1.90c. to 2c. is quoted. We quote iron bars at 1.70c. to 1.75c. for reasonably prompt delivery. Mills charge \$1 extra per ton for twisting ¾-in. and larger steel bars and \$2 extra for ½ to ¾ in.

Sheets.—So far the actual shading in prices of sheets is not over \$2 a ton on galvanized and about \$1 a ton on black. This is being done by mills that have few orders, and also comes from some new capacity that has recently come in the market. Leading sheet mills have contracts from their customers for their entire supply of sheets running over the next two or three months or longer, and as most of these contracts were at lower prices than have been quoted in the market for some time the slight cutting that is being done has not so far seriously affected the situation. A few mills are offering No. 28 galvanized sheets for reasonably prompt delivery at 3.40c. and No. 28 black at 2.30c. Specifications against contracts for black and galvanized sheets are heavy and also for sheets used in automobile bodies and for electrical purposes. This week the American Sheet & Tin Plate Company is operating to about 76 per cent. of its hot sheet mill capacity and would be operating at a larger rate were it not for the shortage in supply of steel. We quote 1.75c. for No. 10 blue annealed; 2.35c. for No. 28 Bessemer black sheets; 3.40c. to 3.50c. for No. 28 galvanized, and 2.30c. for No. 28 tin mill black plate. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

Tin Plate.—Leading makers report that the pressure from consumers for deliveries is getting heavy and they are having more trouble in meeting such demands. All the leading mills are operating to as full capacity as the supply of steel will admit, the American Sheet & Tin Plate Company having this week close to 90 per cent. of its tin mill capacity in operation. All indications are for a good year in the tin plate trade. It is said that regular prices are firmly maintained, but very little new business is being placed. We quote 100 lb. cokes at \$3.60; 100 lb. ternes at \$3.45, and No. 28 black plate at \$2.30, all f.o.b. Pittsburgh.

Hoops and Bands.—Some heavy contracts for hoops and bands have been made for delivery over the last half, and it is said they were placed at full regular prices. The new demand is quiet but specifications against contracts are coming in quite freely. Premiums in prices for early deliveries of both hoops and bands have about disappeared. We quote bands at 1.40c. and hoops at 1.60c. f.o.b. Pittsburgh.

Bolts and Rivets.—The new demand is quiet. As some makers have pretty well caught up on contracts, they are seeking new business more aggressively and as a result prices are being shaded. This does not amount to more than \$1 to \$2 a ton on rivets and probably not more than 5 per cent. on bolts. Regular prices are \$2.20 on button head structural rivets and \$2.30 on cone head boiler rivets. Regular discounts on bolts are as follows, in lots of 300 lb. or over delivered within a 20c. freight radius of maker's works:

Cone and lag screws	80 and 10% off
Small carriage bolts, cut threads.....	75 and 5% off
Small carriage bolts, rolled threads.....	75 and 10% off
Large carriage bolts	70% off
Small machine bolts, cut threads.....	75 and 10% off
Small machine bolts, rolled threads.....	75, 10 and 5% off
Large machine bolts	70 and 7% off
Machine bolts with C.P.C. and T nuts, small.....	75 and 5% off
Machine bolts with C.P.C. and T nuts, large.....	70% off
Square hot pressed nuts, blanked and tapped.....	\$5.70 off list
Hexagon nuts	\$6.30 off list
C.P.C. and R. square nuts, tapped and blank.....	\$5.70 off list
Hexagon nuts, 3/4 and larger	\$6.60 off list
Hexagon nuts smaller than 3/4.....	\$7.20 off list
C.P. plain square nuts	\$5.20 off list
C.P. plain hexagon nuts	\$5.50 off list
Semi-finished hexagon nuts 3/4 and larger.....	85% off
Semi-finished hex. nuts smaller than 3/4.....	85 and 10% off
Rivets, 7/16 x 6 1/2, smaller and shorter.....	75, 10 and 10% off
Rivets, metallic tinned, bulk.....	3 1/2c. per lb. net extra
Rivets, tin plated, bulk.....	1 1/2c. per lb. net extra
Rivets, metallic tinned, packages.....	70, 10 and 10% off

Wire Products.—Specifications against contracts for wire nails made some time ago on the \$1.70 and \$1.75 basis are coming in at a fairly satisfactory rate and this is also true of annealed fence wire, the mills still having a good deal of business on their books. So far little new business has been placed at present quotations for wire nails and annealed fence wire, and it is claimed that these prices are not being rigidly held by one or two mills. Regular prices to jobbers in carload and larger lots are as follows: Wire nails, \$1.80, base, per keg; cut nails, \$1.70 to \$1.75; galvanized barb wire, \$2.20 per 100 lb.; painted, \$1.80; annealed fence wire, \$1.60, and galvanized fence wire, \$2, f.o.b. Pittsburgh, usual terms, freight added to point of delivery. Jobbers charge the usual advances over these prices for small lots from store.

Railroad Spikes.—Specifications from railroads against contracts placed some time ago are showing a

falling off and the new demand is quiet. Prices are slightly lower. We quote railroad spikes in base sizes, 5 1/2 x 9/16 in., at \$1.80 to \$1.85, and small railroad and boat spikes in carload lots at \$1.90 to \$1.95 per 100 lb., f.o.b. Pittsburgh.

Shafting.—Automobile builders are in the market to make contracts for their supply of shafting over the next six or nine months but so far they and the shafting makers do not seem to have been able to get together on prices and few contracts have been closed. The current demand is quiet and specifications are fairly satisfactory, but not as heavy as they were some time ago. We quote cold-rolled shafting at 58 per cent. off in carload lots, and 53 per cent. in small lots delivered in base territory, the usual slight differential over these discounts being allowed to the very largest consumers.

Merchant Steel.—The new demand has quieted down to some extent, and specifications against contracts are not coming in as freely as they were some time ago. Shipments by the mills are a good deal heavier and they have actual orders taking their output over the next two or three months. We quote: Iron finished tire, 1 1/2 x 1/2 in. and larger, 1.40c. to 1.55c., base; under 1 1/2 x 1/2 in., 1.55c. to 1.65c.; planished tire, 1.60c. to 1.70c.; channel tire, 3/4 to 7/8 and 1 in., 1.90c. to 2c.; 1 1/8 in. and larger, 1.80c. to 1.90c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.50c. to 1.65c.; concave and convex, 1.80c. to 1.90c.; cutter shoe, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth finish, 1.80c. to 1.85c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1 1/2 in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.30c.; soft, 3.55c.; coils, hard, 3.20c.; soft, 3.45c.; freight allowed. The usual differentials apply for lighter gauges and sizes.

Merchant Pipe.—No large gas or oil lines have recently been placed with local pipe mills but the current demand is reported good and aggregates a large tonnage. One leading mill reports that on large pipe it is sold up to September and another mill to October. An inquiry is in the market for 8 miles of 14-in. pipe for Western delivery and there are numerous smaller inquiries. The iron and steel pipe mills are running to full capacity but some of the latter are short of steel. It is said that discounts on both iron and steel pipe are in the main being well observed.

Boiler Tubes.—The new demand for both locomotive and merchant tubes continues heavy and the mills have their output sold ahead from three to four months or longer. Some large orders for locomotive tubes have recently been taken by a local interest. On seamless steel tubes, several makers state that their output is sold up to October. Discounts on locomotive and merchant tubes are strongly held.

Coke.—The market continues extremely dull. Standard makes of furnace coke are being offered for prompt delivery at \$2 to \$2.15 and some grades not so well known as low as \$1.85 to \$1.90 at oven. As yet there is no inquiry for furnace coke for last half delivery but a number of contracts expire June 30 and negotiations to renew these will likely start in the near future. One leading coke producer has offered standard furnace coke for last half delivery at \$2.25. The new demand for foundry coke is also dull and prices are weak. We quote standard makes of furnace coke for prompt shipments at \$2 to \$2.15 per net ton at oven and 72-hour foundry coke at \$3 to \$3.10.

Iron and Steel Scrap.—In the past week a local consumer bought 4000 to 5000 tons of selected heavy steel scrap, paying as high as \$14.50 for some of it, but is now out of the market and has recently refused to buy at \$14.25 delivered. The scrap market is growing weaker, and consumers are only buying such material as they absolutely need. All the railroad scrap lists, most of which close early in May, are heavy, particularly in carwheels and old rails. Brokers report that any offers they make to buy scrap are usually quickly taken up, this indicating that dealers believe that prices will go lower. Sales are light and there is a good deal of pressure from dealers to dispose of material. We note sales of 250 tons of old carwheels at \$14.50; 400 tons of turnings at about \$8.50, and 1000 tons of heavy steel scrap at \$14.25, delivered at mills in the Pittsburgh district. A sale is also reported of 300 tons of low phosphorus melting stock at \$16.25, delivered, this being the lowest price this material has touched in a long time. Dealers have again reduced prices on nearly all grades from 25 to 50c. per ton and are now quoting as follows, per gross ton, for delivery in the Pittsburgh and nearby districts:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	\$14.00 to \$14.25
No. 1 foundry cast	14.00 to 14.25
No. 2 foundry cast	13.00 to 13.25
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	10.00 to 10.25
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	15.50 to 16.00
No. 1 railroad malleable stock	13.00 to 13.25
Grate bars	10.00 to 10.25
Low phosphorus melting stock	16.25 to 16.50
Iron car axles	25.50 to 26.00
Steel car axles	19.00 to 19.50
Locomotive axles, steel	23.50 to 24.00
Locomotive axles, iron	27.00 to 27.25
No. 1 busheling scrap	13.00 to 13.25
No. 2 busheling scrap	9.00 to 9.25
Old carwheels	14.50 to 14.75
*Machine shop turnings	8.25 to 8.50
*Cast-iron borings	10.00 to 10.25
†Sheet bar crop ends	16.00 to 16.25
Old iron rails	15.50 to 15.75
No. 1 railroad wrought scrap	14.50 to 14.75
Heavy steel axle turnings	10.75 to 11.00
Stove plate	

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

†Shipping point.

Chicago

CHICAGO, ILL., April 30, 1913.—(By Telegraph.)

The buying side of the market has assumed, for the present at least, the attitude of awaiting developments. Pig-iron conditions are unchanged from the status of the week previous. It is perhaps more apparent that a definite offer of desirable tonnage would bring out lower prices from both Northern and Southern furnaces, but as yet none of the important buyers has brought his negotiations to the closing point. The weakness of pig iron has had its influence on the market in other directions, to which effect have been added the overhanging tariff revision, the tightness of the money market and the undeveloped crop prospects. Thus a degree of conservatism has become a factor in the immediate situation. The reassuring aspects are, in contrast, quite as apparent, as follows: A large portion of last year's crops remains to be moved. A heavy movement of iron ore from mine to dock is certain. The crop outlook to date is excellent. All these combine to provide a forecast of profitable operation for the railroads of the West and Northwest. Insistence upon the delivery of orders now on mill books is undiminished, showing consumption to be unchecked, and more significant, perhaps, is the fact that heavy orders for pig iron and steel are just on the eve of being placed.

Pig Iron.—The buyers and sellers of pig iron continue to spar offensively and defensively for the opportunity not yet apparent, but upon the development of which hangs the placing of many thousands of tons of pig iron. There has been no buying of importance the past week, with little additional inquiry. Purchasers are still anticipating lower prices, and the furnaces are delaying the forcing of their hand with as good grace as possible. On some small lots of Northern iron \$16.75 at the furnace has been done under pressure, but it cannot be stated that Lake iron has as yet met the price of delivered Southern iron on the basis of \$12, Birmingham. Reports of large sales of Southern iron on the basis of \$12 are without much weight in view of the fact that this price has been quoted quite generally. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4	\$18.00 to \$18.75
Northern coke foundry, No. 1	17.25 to 17.75
Northern coke foundry, No. 2	16.75 to 17.25
Northern coke foundry, No. 3	16.25 to 16.75
Southern coke, No. 1 foundry and No. 1 soft	16.85 to 17.35
Southern coke, No. 2 foundry and No. 2 soft	16.35 to 16.85
Southern coke, No. 3	15.85 to 16.35
Southern coke, No. 4	15.85 to 16.35
Southern gray forge	15.85 to 16.35
Malleable Bessemer	15.85
Standard Bessemer	16.75 to 17.25
Basic	19.40 to 19.90
Basic	16.75 to 17.25
Jackson Co. and Kentucky silvery, 6 per cent.	20.40
Jackson Co. and Kentucky silvery, 8 per cent.	21.40
Jackson Co. and Kentucky silvery, 10 per cent.	22.40

(By Mail)

Rails and Track Supplies.—Evidence of the rapidity with which the railroads are pushing new track work may be found in the active demand for spikes, track bolts and angle bars. New contracting is of a miscellaneous character but specifications are heavy. No new rail business is reported in this market. We quote

standard railroad spikes at 1.90c. to 2c., base; track bolts with square nuts, 2.30c. to 2.40c., base, all in carload lots, Chicago; tie plates, \$33 to \$35 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—The mills have improved somewhat the delivery of structural shapes, though this progress is of little significance in view of the tonnage the rolling of which is still months in the future. Additional car business includes 1800 ordered by the Illinois Central from the American Car & Foundry Company. Contracts for fabricated steel placed during the week totaled less than 2000 tons. The Minneapolis Steel & Machinery Company will supply 129 tons for the Coon Rapids Development Company at Anoka, Minn.; the Worden-Allen Company, 116 tons for a city bridge at Sheboygan, Wis. Girders for a pier at Seattle, Wash., will take 390 tons. The American Bridge Company secured the orders for 721 tons for the Brede Building, Chicago; 362 tons for the Century Theatre Auditorium at St. Louis, and 100 tons of transmission towers for the Hydraulic Engineering Company of Maine. Structural prices remain unchanged and we quote for mill shipment, Chicago delivery, 1.63c. to 1.68c.

Store trade in structural shapes is sharply contrasted in its activity with the present lull in mill orders, the demand for material in small lots being undiminished to all appearances. For delivery from warehouse we quote on plain shapes, base sizes, 2.05c.

Plates.—New mill orders for plates are limited almost entirely to carload lots. Of this business there is a fair volume but new tonnages of importance are lacking. For Chicago delivery, mill shipment, we quote 1.63c. to 1.68c.

The call for plates from jobbers' stocks is not so heavy as the demand in some of the other lines, more particularly for building purposes. There is, however, less falling off in the number of orders than in the aggregate tonnage. We quote for store delivery at Chicago, 2.05c.

Sheets.—The weakness in galvanized sheets which has appeared in various quarters for some time is now more general, and quotations based on \$3.40, Pittsburgh, are more common. The concessions now being made appear to have discounted the decline in spelter and it seems likely that the cost of sheet bars will offer opposition to additional weakness. Occasional concessions are also noted in black sheets but these are the exception, and in most instances reflect special pressure to sell in isolated cases. We quote for Chicago delivery in carloads from mill: No. 28 black sheets, 2.53c.; No. 28 galvanized, 3.58c. to 3.68c.; No. 10 blue annealed, 1.93c.

Prices out of store continue without change as follows: No. 10 blue annealed, 2.25c.; No. 28 black, 2.90c.; No. 28 galvanized, 4.15c.

Bars.—Investigation of reports as to the tonnage of steel bars already contracted for by implement interests in this market indicates that these figures have been overestimated. During the past week the leading interest booked only 15,000 tons of this business, and other mills were no more aggressive. The largest implement interests have not yet closed for their requirements and conditions, particularly with reference to price, place no premium on early contracting. A fair tonnage of miscellaneous orders has been placed. Bar iron inquiry and buying are somewhat slower. Greatest activity attaches to carload orders for reinforcing bars. We quote for mill shipment as follows: Bar iron, 1.57½c. to 1.62½c.; soft steel bars, 1.58c. to 1.65c.; hard steel bars, 1.60c. to 1.70c.; shafting in carloads, 58 per cent. off; less than carloads, 53 per cent. off.

The movement of bars from warehouse continues unabated. Warehouse facilities for bending and forming reinforcing bars and liberal handling of cutting specifications have stimulated a brisk demand for this material out of jobbers' stocks. Prices are very firm. For delivery from store, we quote soft steel bars, 1.95c.; bar iron, 1.95c.; reinforcing bars, 1.95c. base with 5c. extra for twisting in sizes ¾ in. and over, and 7½c. extra for smaller sizes; shafting 51 per cent. off.

Wire Products.—A general slackening in wire mill operations is taken to indicate an easing up in the demands on wire producers. Wire nails are seasonably active, however, and shipments are at a normal rate. Barb wire and fencing are temporarily affected by the demands of planting upon the time of the farmer. We quote as follows to jobbers: Plain wire, No. 9 and coarser, base, \$1.78; wire nails, \$1.08; painted barb wire, \$1.98; galvanized, \$2.38; polished staples, \$1.98; galvanized, \$2.33, all Chicago.

Rivets and Bolts.—A moderately active inquiry for

rivets in small lots and a decidedly weak market continue as the prevailing characteristics in connection with this product. The situation as regards nuts and bolts is a parallel, with new business appearing even less frequently. Our quotations are for the most part nominal, actual prices for a desirable order being largely conjectural. We quote from mill as follows: Carriage bolts up to $\frac{3}{4}$ x 6 in., rolled thread, 75-10; cut thread, 75-5; larger sizes, 70-2 $\frac{1}{2}$; machine bolts up to $\frac{3}{4}$ x 4 in., rolled thread, 70-10-5; cut thread, 75-10; large size, 70-7 $\frac{1}{2}$; coach screws, 80-10 hot pressed nuts, square head, \$5.70 off per cwt.; hexagon, \$6.30 off per cwt. Structural rivets, $\frac{3}{4}$ to 1 $\frac{1}{4}$ in., 2.38c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to $\frac{3}{4}$ x 4 in., 70-7 $\frac{1}{2}$; larger sizes, 65-3; carriage bolts up to $\frac{3}{4}$ x 6 in., 70-5; larger sizes, 65 off. Hot pressed nuts, square head, \$5.30, and hexagon, \$5.90 off per cwt.

Cast-Iron Pipe.—Bond issues for the extension of waterworks are being authorized with but little less than ordinary frequency, but a tight money market has made it difficult for many cities to secure a market for their bonds. Improvements of importance are contemplated at Kansas City, Kan., and at Joplin, Mo. Prices are soft. We quote as follows per net ton, Chicago: Water pipe, 4 in., \$29.50; 6 to 12 in., \$27.50; 16 in. and up, \$26.50, with \$1 extra for gas pipe.

Old Material.—Old material is moving through the customary channels with extreme sluggishness in this market. The inrush of scrap from railroad and country dealer seems unceasing while the outlets to the melters' stockpiles are continuously clogged. The presence of the Santa Fé accumulation is a constant burden upon the market, the more pronounced with the increasing desire of that railroad to sell. Prices for practically all grades of material are lower by 25 and 50c. a ton. In some grades, such as old carwheels, our quotations are purely nominal, the absence of any transactions preventing changes in prices in keeping with the balance of the market. Railroad offerings now current include 2500 tons from the Chicago, Rock Island & Pacific, of which 600 tons are rerolling rails, and 3700 tons from the Chicago & Northwestern, which includes 500 tons of rerollers and 400 tons of frogs, switches and guard rails. But a small portion of last week's Burlington list was disposed of in the market, the larger portion going to mills on an exchange basis. We have revised our quotations and quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$16.00 to \$16.50
Old steel rails, rerolling	14.25 to 14.75
Old steel rails, less than 3 ft.	13.00 to 13.50
Relaying rails, standard section, subject to inspection	24.00
Old carwheels	16.75 to 17.25
Heavy melting steel scrap	12.00 to 12.50
Frogs, switches and guards, cut apart	11.75 to 12.25
Shoveling steel	11.75 to 12.25
Steel axle turnings	10.00 to 10.50
Per Net Ton	
Iron, angles and splice bars	\$15.50 to \$16.00
Iron arch bars and transoms	15.75 to 16.25
Steel angle bars	11.25 to 11.75
Iron car axles	19.75 to 21.25
Steel car axles	18.75 to 19.00
No. 1 railroad wrought	11.75 to 12.25
No. 2 railroad wrought	11.00 to 11.50
Cut forge	11.00 to 11.50
Steel knuckles and couplers	11.50 to 12.00
Steel springs	12.00 to 12.50
Locomotive tires, smooth	13.00 to 13.50
Machine shop turnings	6.75 to 7.25
Cast and mixed borings	6.00 to 6.50
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.50 to 8.00
No. 1 boilers, cut to sheets and rings	8.25 to 8.75
Boiler punchings	12.25 to 12.75
No. 1 cast scrap	12.00 to 12.50
Stove plate and light cast scrap	10.00 to 10.50
Railroad malleable	12.50 to 13.00
Agricultural malleable	11.00 to 11.50
Pipes and flues	8.75 to 9.25

Philadelphia

PHILADELPHIA, Pa., April 29, 1913.

Notwithstanding the comparatively good general statistical position the pig-iron market continues to ease off, foundry grades being about 25c. lower. Pig-iron stocks have been gradually increasing in the East, but have declined in the West and the aggregate on furnace yards is smaller than at the beginning of the year and now represents about one-half of the total stocks a year ago. Consumers of pig iron, in view of the continued reduction in prices, are still holding back purchases, and the volume of business in this district has been compar-

atively light. In finished materials plates continue the most active and Eastern mills get full prices. Delivery on plain shapes is easier and Eastern mills are gradually getting prices down to the Western basis. Heavy specifications for billets and sheets are being received by Eastern mills. Premiums for steel bars are gradually disappearing. Old material is weak, with some further declines in prices. Coke remains quiet.

Iron Ore.—The market is practically at a standstill. Consumers are awaiting developments in the pig-iron market. The first cargo of Wabana ore to come down this season was received at this port April 28. Importations during the week included 5931 tons of Swedish and 11,800 tons of Cuban ore.

Pig Iron.—The continued uncertainty as to prices and the expressed willingness of producers to make concessions for desirable business keep buyers out of the market for anything beyond immediate needs, and even in such cases the tonnage is pared down to the smallest possible amount. That a buying movement will set in before long is the general opinion in the trade, but until prices reach what may prove to be a firm level buyers are disposed to hold off. Meantime stocks in consumers' yards are being heavily drawn upon. Some producers have refused to make lower prices, but such action practically puts them out of the market. Certain sellers have openly expressed a willingness to accept \$17, delivered, for standard brands of eastern Pennsylvania No. 2 X, which represents a decline of 25c. a ton. The bulk of the recent sales has been confined to small lots for early shipment, usually at \$17.25, delivered, although \$17.10 has been done. The movement in Virginia foundry iron has been extremely light. Odd lots have been sold to regular customers at \$15, at furnace, for No. 2 X, but it is freely admitted that \$14.50 could be done, if buyers were ready to place reasonable orders. Resale Virginia No. 2 X has been marketed at close to the inside basis. Pipe makers in this district have again made further purchases of low-grade iron. Moderate sales, probably aggregating 2500 tons, of Eastern off irons have been effected to Delaware River makers at prices ranging from \$16 to \$16.25. A reported sale of several thousand tons of Virginia pipe iron to a pipe maker in this district at \$14 at furnace lacks confirmation. Evidently pipe makers are still willing to take on odd lots of iron whenever offered at attractive prices. Inquiry for foundry iron has been more active, but as a rule small quantities only are involved. The Baldwin Locomotive Works is asking for 1500 tons of low-silicon cylinder pig, while a malleable-iron maker has an inquiry out for 500 tons of coke malleable for June delivery. A more active demand for rolling-mill forge iron has developed. One mill is in the market for 2000 to 3000 tons and other business is in sight. This grade is now quoted at \$16 to \$16.25, delivered. Steel-making irons are quiet. Reports of further purchases of basic by the recent purchaser of 40,000 tons are denied. One Eastern melter has been quietly feeling the market for a few thousand tons of this grade, hoping for price concessions, but has not been able to shade \$16.50, delivered, for standard-analysis iron. Low-phosphorus iron is selling in small lots at \$23.50, delivered, for standard brands. The general tendency of pig-iron prices has been downward. At the present low levels several producers in the East are seriously considering the blowing out of furnaces, and some curtailment has been made in the Lehigh Valley. For delivery in buyers' yards in this district the following range of prices is named:

Eastern Pennsylvania No. 2 X foundry	\$17.00 to \$17.50
Eastern Pennsylvania No. 2 plain	16.75 to 17.00
Virginia No. 2 X foundry	17.30 to 17.50
Virginia No. 2 plain	17.05 to 17.25
Gray forge	16.00 to 16.25
Basic	16.50
Standard low phosphorus	23.50

Ferroalloys.—No inquiry for forward ferromanganese has come out and there has also been an absence in the demand for prompt. Eighty per cent. ferromanganese, for either prompt or forward shipment, is nominally quoted at \$61, seaboard. The importation of ferromanganese at this port last week was confined to 125 tons. There has been little demand for ferrosilicon and prices are unchanged.

Billets.—While orders are not heavy, a satisfactory miscellaneous lot business is moving in rolling billets. Specifications against contracts have been quite heavy. Eastern makers are now pretty well sold up for both the second and third quarters. Some consumers are urging makers for quick deliveries against specifications. Basic open hearth rolling billets are firm on a basis of \$29 to \$30, delivered in this district. Forging billets have been moderately active and are quoted at \$34, minimum, Eastern mill, for ordinary analysis steel.

Plates.—A surprisingly large volume of business is coming to Eastern mills. The aggregate, while made up mostly of miscellaneous orders, exceeds mill capacities, and deliveries are hardening. The Lukens Iron & Steel Company reports rollings and shipments during the first quarter, at a yearly basis of 273,000 tons, the best previous record for any quarter having been on the basis of 215,000 tons yearly. That this rate of production can be maintained for the remainder of the year is, however, considered doubtful. The railroad demand for plates continues good, particularly for bridge work. More demand for ship plates is in sight. Eastern mills fully maintain recent quotations of 1.75c. to 1.80c., delivered here, while Western plates, available for extended shipment, are quoted at 1.60c. to 1.65c. here.

Structural Material.—Eastern makers of heavy shapes are now in a position to give much better deliveries, and prices have been brought to the level of Western quotations. On small shapes, however, mills are still crowded and have gained but little on deliveries. New business in structural material is confined principally to small miscellaneous lots. Bids are in on several good sized specifications for building and bridge work, but contracts develop slowly. Prices show irregularity. Heavy shapes are available from both eastern and western mills at 1.60c. to 1.65c. here, but on small shapes Eastern mills continue to quote around 1.75c., mill.

Sheets.—The demand continues active and Eastern mills are comfortably fixed with orders up to June 1. The bulk of the business continues in small lots, for which consumers frequently urge makers for early delivery. Prices of Eastern sheets now closely approximate Western quotations, although occasionally small premiums are asked for prompt shipment. Western No. 10 blue annealed sheets are quoted at 1.90c. here, while Eastern mills making smooth loose-rolled sheets quote from 1.90c. to 1.95c.

Bars.—Irregularity is still noticeable in the demand for iron bars. Steel bars continue active, but, being in better supply, premiums for early delivery are less in evidence. Current orders for iron bars have been largely confined to small lots, for which makers of ordinary bars quote from 1.57½c. to 1.62½c. delivered here, although better grades command higher prices. Steel bars on contract are firm at 1.55c. to 1.60c., and makers are not disposed to enter orders for extended delivery at the inside price.

Coke.—The market is quiet. Moderate sales of foundry coke are being made at \$2.75 to \$3.25 at oven, but business lacks snap. Little movement in furnace coke is noted. Small lots of spot coke have been sold at \$1.90 to \$2 at oven, but the general market is around \$2.25. Consumers show no haste in contracting for second half supplies. For delivery in consumers' yards, in this district, the following range, per net ton, about represents the market:

Connellsville furnace coke	\$4.05 to \$4.50
Connellsville foundry coke	4.90 to 5.40
Mountain furnace coke	3.75 to 4.10
Mountain foundry coke	4.50 to 5.00

Old Material.—Increased offerings of various grades have further weakened the market, and lower prices have developed in nearly all grades. An aggregate of several thousand tons of strictly No. 1 heavy melting steel has been taken by one Eastern mill at \$13, delivered, although several other large consumers refuse to pay over \$12.50. Dealers have bought moderate lots at the latter figure. Rolling mill grades continue dull. Small sales at concessions have been more general. Quotations, while to a large extent nominal, range about as follows for delivery in buyers' yards in this district, covering eastern Pennsylvania and nearby points, taking a freight rate varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel.....	\$12.50 to \$13.00
Old steel rails, rerolling (nominal).....	15.00 to 15.50
Low phosphorus heavy melting steel scrap..	17.00 to 17.50
Old steel axles (nominal).....	18.00 to 19.00
Old iron axles (nominal).....	26.00 to 27.00
Old iron rails	18.00 to 18.50
Old carwheels	14.25 to 14.75
No. 1 railroad wrought	15.00 to 15.50
Wrought-iron pipe	12.50 to 13.00
No. 1 forge fire	11.50 to 12.00
No. 2 light iron (nominal)	7.00 to 7.50
No. 2 cut busheling	9.00 to 9.50
Wrought turnings	9.50 to 10.50
Cast borings	10.00 to 10.50
Machinery cast	13.75 to 14.25
Grate bars, railroad	10.00 to 10.50
Stove plate	10.00 to 10.50
Railroad malleable (nominal)	12.75 to 13.00

Cleveland

CLEVELAND, OHIO, April 29, 1913.

Most of the large fleets of ore boats are on their way up the Lakes and before the end of the week about all of them will be in operation. Navigation is now open but there is still considerable ice in Lake Superior. The first ore cargo from the head of the Lakes reached Cleveland April 26, two days after the first cargo from Escanaba. No new inquiry is coming out for ore, although sellers expect that considerable additional tonnage will be needed before the season is over. Some further buying was looked for at the time of the opening of navigation, but that this has not yet developed is attributed to the limited ordering of pig iron for the last half. We quote prices as follows: Old Range Bessemer, \$4.40; Mesaba Bessemer, \$4.15; Old Range non-Bessemer, \$3.60; Mesaba non-Bessemer, \$3.40.

Pig Iron.—Low prices on foundry grades have not yet resulted in the sale of much for last-half delivery. With a declining market buyers are holding off, waiting for the bottom. Several inquiries that have come out in the past two weeks have not resulted in the placing of orders, the prospective purchasers deciding to await developments. A few large consumers are now feeling the market on round lot purchases of foundry, basic and malleable grades, and if these decide to buy prices may be established in the next few days. However, furnacemen generally do not look for an active buying movement in the immediate future. Some are content to play a waiting game and are making no efforts to effect sales. Last week a few last-half sales of foundry iron were noted at \$15, Valley furnace, for No. 2, and this quotation has become quite general, although a few producers are naming \$15.25 as a minimum. For outside shipments the \$15 price is being quoted by Cleveland furnaces. While southern Ohio iron is quoted at \$15.50, Iron-ton, a good sized inquiry would probably bring out \$15. On Southern grades \$12, Birmingham, for No. 2 for the remainder of the year is now generally made. We note the sale of 175 tons of Southern charcoal at \$25, Birmingham. For shipment during the remainder of the year we quote, delivered Cleveland, as follows:

Bessemer	\$17.90
Basic	\$16.40 to 16.65
Northern No. 2 foundry	15.90 to 16.15
Southern No. 2 foundry	16.35
Gray forge	15.50 to 15.65
Jackson County silvery, 8 per cent. silicon, ..	20.55 to 21.05

Coke.—The market is dull. Furnace coke for prompt shipment is weak, but prices for contract are being well maintained. Some market feelers for last-half prices have brought out uniform quotations of \$2.50. Standard Connellsville furnace coke for spot shipment is quoted at \$2 to \$2.25 per net ton at oven. We quote standard 72-hr. foundry coke at \$3 to \$3.25 for prompt shipment and contract.

Finished Iron and Steel.—New business is light and the volume of specifications is only moderate. However, the consumption appears to be as heavy as ever and consumers continue to crowd the mills for deliveries. The absence of specifications is explained by the fact that most consumers already have specifications in for months ahead, in many cases for deliveries up to next January. Warehouse business continues heavy. While the demand for early delivery is lighter than it was a few weeks ago, Eastern mills continue to take some orders in this territory for early delivery. The demand for steel bars for reinforcing purposes is quite active. In structural lines a good volume of small work is coming out and several large building projects developed in Cleveland during the week that are expected to require a round tonnage of steel within the next few months. Among the new inquiries is one from Arthur G. McKee, Cleveland, for 800 tons of steel for new trestles and bins for the Marting and Iron-ton blast furnace plants of the Marting Iron & Steel Company. The demand for iron bars is not active, but the local market is firm at 1.60c. to 1.65c., Cleveland mill. Some shading of bar iron prices is reported in the West. Sheet mills are getting a moderate volume of business. Some shading on galvanized sheets is reported by Ohio mills. Warehouse prices are unchanged at 2.10c. for steel bars and 2.25c. for plates and structural material.

Old Material.—The market is exceedingly dull and weaker. Local mills are entirely out of the market, and those consumers who are willing to buy small lots are offering lower prices than they were willing to pay a week ago. The supply of scrap is abundant but deal-

ers generally appear to be making little effort to force sales. About the only transactions are between dealers. Turnings are a drug on the market. Heavy steel scrap has declined 25c. a ton and several other quotations are 25c. to 50c. a ton lower. The absence of transactions makes other quotations largely nominal. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton.	
Old steel rails, rerolling	\$14.50 to \$15.00
Old iron rails	16.00 to 16.50
Steel car axles	18.75 to 19.25
Heavy melting steel	12.50 to 12.75
Old carwheels	15.00 to 15.50
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	11.75 to 12.00
Railroad malleable	13.50 to 14.00
Light bundled sheet scrap	10.00 to 10.50

Per Net Ton.	
Iron car axles	\$21.00 to \$21.50
Cast borings	7.50 to 8.00
Iron and steel turnings and drillings	5.75 to 6.00
Steel axle turnings	9.00 to 9.25
No. 1 busheling	11.25 to 11.75
No. 1 railroad wrought	12.75 to 13.00
No. 1 cast	12.25 to 12.50
Stove plate	9.00 to 9.50
Bundled tin scrap	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, April 30, 1913.—(By Telegraph.)

Pig Iron.—The turning point in the market is undoubtedly close by, but predictions of either buyers or sellers are apparently of no value just now. As is usually the case when prices are not firm, consumers are holding back, claiming that lower quotations will come out. On the other hand, producers can truthfully call attention to the heavy shipments on contracts, which in some cases have exceeded original specifications. At present the buyers appear to have the best of the situation, but as so many of them are yet in need of a last half supply there is no telling when the position may be reversed. Northern foundry iron is weak, and \$15. Ironton, is being done, with deliveries extended, in some instances, through the last half. Southern No. 2 foundry is generally quoted around \$12, Birmingham, and while several producers are asking more on last half business this figure has been inserted in a few small contracts for that delivery. Inquiries are scarce, and practically the only business being done is through the direct solicitation of salesmen. Basic is firmer than foundry iron, and a large Central Western melter who has been looking around for about 10,000 tons, for last half shipment, is expected to come into the market soon. A southern Ohio manufacturer will probably contract for 1500 tons of Southern foundry iron next week. Other inquiries are limited to small tonnages of foundry iron for immediate requirements. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	\$15.75 to \$16.25
Southern coke, No. 2 foundry and 2 soft	15.25 to 15.75
Southern coke, No. 3 foundry	15.05 to 15.55
Southern, No. 4 foundry	14.85 to 15.35
Southern gray forge	14.65 to 15.15
Ohio silvery, 8 per cent. silicon	20.20 to 20.70
Southern Ohio coke, No. 1	17.20 to 17.70
Southern Ohio coke, No. 2	16.20 to 16.70
Southern Ohio coke, No. 3	15.95 to 16.45
Southern Ohio malleable Bessemer	16.45 to 16.95
Basic, Northern	18.75 to 19.25
Lake Superior charcoal	27.25 to 27.75
Standard Southern carwheel	27.25 to 27.75

(By Mail)

Coke.—With the exception of small orders from foundries, there is little doing. While the railroads have now lifted all embargoes, a few southern Ohio furnaces are still having trouble in getting an adequate coke supply, as their stocks were depleted during the flood period. Prices are not quite as strong as at the same time last week. We continue to quote \$2.25 per net ton at oven for 48-hr. coke and \$3 to \$3.50 for leading 72-hr. brands. For prompt shipment these quotations can be shaded in all three producing districts.

Finished Material.—The expected demand for structural material has not yet developed, but quite a large amount of wire nails is being sold in this territory, mostly through the hardware dealers. Railroad track material also shows considerable improvement, and the question of making deliveries on time is one that has bothered mill agencies to no little extent. Local warehouse prices on structural shapes remain around 2.15c. to 2.25c. and on steel bars 2.10c. to 2.15c. The local mill reports a good foreign demand for galvanized sheets.

Old Material.—The market is weak, due to the disposition of buyers to make any heavy commitments. A number of dealers state that their larger customers are holding back to await tariff developments. The heavy offerings from the railroads also have something to do with the softening of prices. The minimum figures given below represent what dealers are willing to pay for delivery in their yards southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton.	
Bundled sheet scrap	\$9.75 to \$10.25
Old iron rails	13.25 to 13.75
Relaying rails, 50 lb. and up	20.25 to 20.75
Rerolling steel rails	12.25 to 12.75
Melting steel rails	10.25 to 10.75
Old carwheels	12.00 to 12.50

Per Net Ton.	
No. 1 railroad wrought	\$10.25 to \$10.75
Cast borings	6.00 to 6.50
Steel turnings	6.00 to 6.50
No. 1 cast scrap	10.00 to 10.50
Burnt scrap	7.25 to 7.75
Old iron axles	17.50 to 18.00
Locomotive tires (smooth inside)	11.25 to 11.75
Pipes and flues	6.75 to 7.25
Malleable and steel scrap	8.50 to 9.00
Railroad tank and sheet scrap	5.50 to 6.00

St. Louis

ST. LOUIS, Mo., April 28, 1913.

The iron and steel market has shown some peculiar phases, especially in that much heavier buying of pig iron has brought no stiffening of the quotations.

Pig Iron.—With an open quotation of \$12 per ton for No. 2 Southern, Birmingham basis, and hints that better than that figure could be obtained, there was pretty heavy buying, but prices continued soft. The aggregate of sales for the week was easily 20,000 tons and a noteworthy feature was the extent to which early delivery figured in the deals, comparatively little being put off to the last quarter. Included in the sales was 1000 tons of low phosphorus iron, 1000 tons of No. 3 Southern, two other sales of 1000 tons, one of 2000 tons and several of 500 tons. There was also a sale of 650 tons of carwheel iron and quite a number of transactions in special analysis iron. A considerable portion of the buying was done by stove plants, including those at Quincy, Ill., and Hannibal, Mo. More and larger inquiries are in the market, among them being one for 1200 tons, one for 1000 tons, one for 600 tons, one for 500 tons and a considerable number below 500 tons. Nominally \$12 to \$12.50 is the quotation, but intimations of prices below \$12 cannot be verified despite their currency. Chicago No. 2 X is quoted at \$16.75 per ton at furnace and Ohio No. 2 at \$15.25, Ironton, basis. Further buying is looked for the current week.

Coke.—Considerable activity has developed, partly due to relief in shipping and partly to the more accentuated need of coke. One transaction of the week was for 2000 tons of by-product coke coming from the Koppers ovens at Joliet, while another large transaction is likely to be completed in a short time. There was considerable buying of small lots and foundrymen are feeling much easier now that shipments can be reasonably assured. By-product coke is quotable at about \$5.50, St. Louis.

Finished Iron and Steel.—New business in structural material continues in small quantities, though a number of good contracts are awaiting definite settlement of financing, which has been considerably interfered with by the troubles prevailing between the state officials and the Western Union and Western Insurance Bureau. The withdrawal of the members of the bureau from the state is holding up both loans direct and loans dependent on proper insurance. In the fabricating shops work is being kept up practically to capacity. In standard rails there were sales of 500 tons each to two small steam roads and the Missouri Pacific transaction for 25,000 tons was finally released. In light rails very little is doing, both the coal and the lumber interests being out of the market for the most part. Soft steel bars are quiet, but reinforcing material is in good request. Practically nothing is doing in plates. Track fastenings are quiet except for heavy specifications from roads already under contract.

Old Material.—In the scrap market the condition is one of continued deadly dullness except for relaying rails for which there is some little inquiry. The mills still have embargoes in force and added to that is the labor troubles on the east side of the river to depress conditions still more. The only list out during the week was one for 3500 tons from the Rock Island, closing next week. Lists for the other roads in this sec-

tion will be out in about a week and these, when closed, will give a better idea of the market prices than can be gained at present. The figures are now really nominal. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.	
Old iron rails	\$13.00 to \$13.50
Old steel rails, rerolling	13.25 to 13.75
Old steel rails, less than 3 ft.	11.50 to 12.00
Relaying rails, standard section, subject to inspection	22.50 to 23.50
Old carwheels	14.00 to 14.50
Heavy melting steel scrap	11.25 to 11.75
Frogs, switches and guards, cut apart	11.00 to 11.50

Per Net Ton.	
Iron fish plates	\$11.50 to \$12.00
Iron car axles	19.50 to 20.00
Steel car axles	16.50 to 17.00
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.50 to 11.00
Railway springs	9.50 to 10.00
Locomotive tires, smooth	11.00 to 11.50
Wrought arch bars and transoms	14.00 to 14.50
Steel couplers and knuckles	9.50 to 10.00
No. 1 dealers' forge	8.00 to 8.50
Mixed borings	6.00 to 6.50
No. 1 busheling	9.75 to 10.25
No. 1 boilers, cut to sheets and rings	6.50 to 7.00
No. 1 cast scrap	9.00 to 9.50
Stove plate and light cast scrap	8.00 to 8.50
Railroad malleable	9.50 to 10.00
Agricultural malleable	8.00 to 8.50
Pipes and flues	6.50 to 7.00
Railroad sheet and tank scrap	6.00 to 6.50
Railroad grate bars	7.00 to 7.50
Machine shop turnings	7.00 to 7.50
Bundled sheet scrap	5.75 to 6.25

Birmingham

BIRMINGHAM, ALA., April 28, 1913.

Pig Iron.—There has been little, if any, recession from the basis of \$12.50 in recent iron sales made in the Birmingham district, even though shading of that price is reported in the case of Tennessee furnaces, which can afford to sacrifice some of the freight rate differential. Very little is heard of resale iron. Brokers are not doing a business worth speaking of, the state of the market working against them. Denial is made of a reported sale of 50,000 tons to the International Harvester Company. The company alleged to have made the sale says it has not "sold one pound of iron" to this consumer. Furnace interests have made sales recently around \$12.50. One concern which was among the first to sell under \$13 now offers nothing under that price; being sold well ahead and having moved a large accumulation of metal, it is not seeking new business at current quotations. A leading seller has about 40,000 tons on yards and another has large accumulations, with a new furnace ready for the torch. Fires will not be lighted, however, it is understood, unless prices improve. One furnace company sold an aggregate of 1000 tons in the week at from \$12.50 to \$13, many of the sales at the latter figure being small orders. Another furnace company sold carload lots at \$12.75. Furnace operations are at a good rate and the local demand is maintained. The American Radiator Company's new plant will be ready for operation next month and the water pipe plant of the National Cast Iron Pipe Company, by early autumn. Prices per gross ton f.o.b. cars at Birmingham district furnaces are as follows, the general basis being in the first column of figures:

No. 1 foundry and soft	\$13.00 to \$13.50
No. 2 foundry and soft	12.50 to 13.00
No. 3 foundry	12.25 to 12.75
No. 4 foundry	12.00 to 12.50
Gray forge	11.75 to 12.25
Basic	13.00 to 13.50
Charcoal	25.00 to 25.50

Cast Iron Pipe.—The larger pipe concerns are operating to capacity and accumulating stock. There is still a dearth of orders for large consignments. The city of El Paso, Texas, has placed an order for 1000 tons with the leading interest. Other orders are for extension and repair work. No change has been made in quotations, but large transactions would probably bring out special prices. We quote \$23.50 for 4-in. and \$21.50 for 6-in. and upward.

Coal and Coke.—Orders for summer stocking of domestic yards are coming in satisfactorily and the demand from the ports is increasing. Prospects for summer operations are very good. Prices remain about the same as at this time last year. There is a scarcity of 72-hour coke and all grades are more in demand than supply. As a result prices are firm at the figures ruling the past several weeks, which, per net ton at the ovens, are as follows: Furnace, \$3 to \$3.50; foundry, \$3.50 to \$4.25.

Old Material.—The market is without special feature. There seems to be no established price, each sale

being a law to itself. Nominal quotations per gross ton f.o.b. dealers' yards are as follows:

Old iron axles	\$15.00 to \$15.50
Old steel axles	15.00 to 15.50
Old iron rails	13.50 to 14.00
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	10.50 to 11.50
No. 1 country wrought	10.00 to 10.50
No. 2 country wrought	9.00 to 9.50
No. 1 machinery cast	10.00 to 10.50
No. 1 steel scrap	10.50 to 11.00
Tram carwheels	11.00 to 11.50
Standard carwheels	12.50 to 13.00
Light cast and stove plates	8.50 to 9.00

Boston

BOSTON, MASS., April 29, 1913.

Old Material.—The continued stagnation has resulted in a further decline in prices. Dealers believe that prices will recede still farther if the dullness continues. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	\$10.50 to \$10.75
Low phosphorus steel	13.50 to 14.50
Old steel axles	14.50 to 15.00
Old iron axles	22.50 to 23.00
Mixed shafting	13.50 to 13.75
No. 1 wrought and soft steel	10.75 to 11.00
Skeleton (bundled)	9.00 to 9.50
Wrought-iron pipe	9.50 to 10.00
Cotton ties (bundled)	9.50 to 9.75
No. 2 light	4.00 to 4.50
Wrought turnings	7.00 to 7.50
Cast borings	7.00 to 7.50
Machinery, cast	15.00 to 15.50
Malleable	10.50 to 11.00
Stove plate	8.50 to 9.00
Grate bars	7.50 to 7.75
Cast-iron carwheels	14.00 to 14.50

San Francisco

SAN FRANCISCO, CAL., April 22, 1913.

Deliveries of material specified earlier in the season are rather heavy, keeping stocks in good shape, and current specifications in several lines are smaller than for a month or two. There is also general hesitation on the part of both manufacturers and merchants to close the usual contracts for delivery in second half. The consuming market, however, remains in excellent condition, with large construction contracts still coming up, and while the smaller shops have little work booked for the future they are busy at present. Building requirements are increasing, especially in the South, and important inquiries are out for municipal improvements.

Bars.—Supplies, though not excessive, are adequate for immediate needs. With larger deliveries expected the new tonnage of soft steel bars placed by local jobbers is but moderate. The distributive trade, however, is active. The improved crop outlook has brought a livelier demand from the small trade through the country, and large manufacturers are buying more material than usual from store. The demand for reinforcing bars is said to be less urgent than for some time, but the market remains firm, with local mills closely sold up, and there is every prospect of unusually heavy summer requirements. Soft steel bars, in jobbing lots, are firmly held at 2.75c., and iron at 2.65c.

Structural Material.—Fabricating contracts are coming out more freely than for some time, several important jobs having been let in the last fortnight, in addition to considerable work of a small nature. Prospects of large work for the future are also taking more definite shape and local shops expect to be well occupied before the end of the year. A fair tonnage of plain material is arriving on old orders, and with 90-day delivery promised on new orders the shops are in a better position to figure on pending contracts. The largest job recently let was the Clift estate building, 1700 tons, taken by Milliken Bros. The 11-story First Trust & Savings Bank job in Oakland, about 450 tons, was taken by the Pacific Rolling Mill Company, and the Western Iron Works has about 350 tons for the 10-story Thompson building at Seventeenth street and Broadway, Oakland. The Ralston Iron Works will fabricate about 450 tons for three two-story buildings for the Central Realty Company at Mission and New Montgomery streets. Some of the smaller jobs are: West Coast Iron Company's furnace and sheds at Sixteenth and Rhode Island streets, let to Dyer Bros. and Mortenson Construction

Company; Macdonough estate building, Bush street near Dupont, to Central Iron Works, and an addition to building at Grant avenue and Harlan place, to Mortenson Construction Company. Steel plans are complete for the Civic Center auditorium to be erected by the Exposition Company, and a call for bids is expected this week, about 3500 tons being required for the main building and 450 tons for the dome. A call for bids for the city hall steel, 6000 to 7000 tons, is expected April 24. New bids will be opened April 24 for the Oakland auditorium. It is announced that another large addition will soon be made to the Mills building, to cover a lot 66 by 137 ft., at an estimated cost of \$500,000. Nothing new has developed on the Spreckels and Hobart estate buildings, but it is believed they will be carried out as planned.

Rails.—Nothing of special significance has developed, but single orders running up to about 100 tons are fairly numerous, most of the business being in smaller than 50-lb. sections. The larger interurban lines have so far been buying only in small lots as the material is needed, but there is a good demand from other sources. A good many buyers are holding off in the effort to pick up re-laying rails, all offerings of which find ready sale at good prices.

Sheets.—Recent deliveries in southern California have been heavy. While the demand there is remarkably strong stocks are in excess of immediate needs, causing some curtailment of new business in that quarter. Locally supplies are moderate and specifications fairly large, with heavy requirements both for building and pipe work, and the jobbing movement is somewhat better than normal. Buyers are reticent, however, about placing orders for the next quarter.

Plates.—Large tank work is still about the most important item, and while the largest requirements are pretty well covered with specifications and new orders are coming out in good shape. The larger manufacturers are well occupied with old tank and penstock contracts, and there is a fair prospect of more business for hydroelectric construction. Small shops are buying only for immediate needs, but the movement from store is better than for some time past. As in other lines contracts for extended delivery are pretty closely limited to definitely assured requirements.

Merchant Pipe.—A notable development this year is the increased proportion of galvanized pipe taken by the country trade. Some merchants are still rather heavily supplied with black, but stocks of galvanized have been greatly reduced. Local and Los Angeles building requirements have increased greatly, and merchants who recently appeared to be overstocked expect to clean up in good shape by the end of June. Specifications are light but increasing, and a good buying movement is expected shortly. There is considerable oil and gas pipe and waterworks business in prospect, and some inquiry is noted in connection with power plants. The advance in mill prices, combined with a better consuming demand, has given a much better tone to the market.

Cast Iron Pipe.—The city of San Diego is in the market again with its inquiry for about 4700 tons, which will probably be placed. Sizes specified range from 4 to 30 in. Nothing else of great importance is coming up, but Los Angeles is taking figures on about 300 tons, and the town of Anaheim, Cal., for about 101 tons. A fair tonnage is also offered in various parts of Oregon and Washington. The contract for Suisun, Cal., was taken by the Lynchburg Foundry Company. Prices for Pacific coast delivery stand as for some time.

Pig Iron.—The foundry trade continues to buy on a rather small scale, most of the business being in one or two carload lots, as melters are unwilling to accumulate any surplus. Foreign iron is still scarce, and Jarrow, ex warehouse, is firmly held at \$27 per gross ton. Some foreign iron will probably arrive during the fall, but the spot market is not yet affected. No. 1 Southern soft, which finds more demand than anything else, is quoted at \$23 to \$24, and No. 2 foundry at about \$22.50, per gross ton.

Coke.—Business is quiet, but with light supplies of foreign coke on hand the spot price is maintained at \$15 to \$15.50 per net ton, ex yard. Southern coke is offered, to arrive, at \$12 to \$12.50, per net ton, but finds little demand. German Syndicate coke for shipment by sailing vessel is still quoted at \$12.50 to \$13.50, per gross ton, but some that is being loaded for early steamer shipment is held at \$14.

Old Material.—The strength of the local scrap market is fully maintained, with an active demand for all lines and an increasing scarcity of supplies. While melters are reluctant to pay present prices desirable lots of cast-iron scrap are kept well cleaned up, and some business is done around \$18, per net ton, with heavy machinery scrap held higher. Steel melting scrap finds a

ready market at about \$13, per gross ton; rerolling rails are quoted at \$17, per net ton, and wrought scrap at \$13 to \$15.

The Pacific Sanitary Mfg. Company now has its new plant at Richmond, Cal., in operation, with a daily producing capacity of 200 enameled cast-iron bathtubs and 600 pieces of small ware. The foundry department has a daily melting capacity of about 25 tons.

German Trade Still Receding

Bar Mills Anxious for Business
and Plate Orders Getting Scarce

BERLIN, April 18, 1913.

The position of the iron market continues to deteriorate. Prices for bars have further weakened, and a scarcity of orders is making itself felt in plates other than ship plates. In ship plates the orders of the Kontor, or selling agency, amount to about 250,000 tons, which is the production of the mills for almost a full year. The weakening of bar prices applies to both home and foreign orders. Some of the mills are offering them for home consumption at 115 to 116 marks, and isolated offers of 114 marks are reported. These prices are for cash, loaded for shipment. Export orders are placed without difficulty at 110 to 111 marks. The mills are hunting for business more actively than hitherto, as orders in hand are rapidly being worked off. Notwithstanding the reduced prices, however, buyers are not inclined to purchase in other than hand-to-mouth quantities. It is thought probable, nevertheless, that buying will soon grow more active, as the war at last appears to be about at an end. It is noted as a good indication of further developments that Silesian mills have already received pretty good orders from Balkan countries.

Pig Iron in Satisfactory Shape

The pig-iron trade continues satisfactory. There are no signs of weakness at any point. Although production is at high-water mark, the trade readily absorbs all the iron turned out and the stocks at furnaces are being further reduced. The shipments of the Syndicate in March were equal to the full allotments of the members, whereas in February they were 7.3 per cent. less than the allotments. In the Silesian district the price of No. 3 foundry iron has been raised 2 marks a ton to equalize it with the price of English iron of like grade.

It has now been found that the Rod Association cannot be renewed if the condition demanded by some of the mills—namely, that the wire and wire nail mills also organize at the same time—be insisted upon. The members of the association are still trying to agree upon a form of contract to prolong their organization; and, to gain time for further negotiations, the date for allowing the members to begin taking orders for their own account, if the prolongation fails, has been moved forward from May 1 to June 30.

The exports of leading iron and steel products in March were as follows: Pig iron, 77,200 tons, against 81,000 tons a year ago; ingots and semi-finished steel, 57,800 tons, against 29,700 tons; beams, 38,000 tons, against 33,400 tons; steel rails, 41,800 tons, against 49,000 tons; and ties, 7400 tons, against 13,000 tons.

Conditions in Belgium and Austria

The general strike that has broken out in Belgium is expected to bring increased business to the German iron trade; and from this viewpoint iron shares have been pretty strongly lifted in price this week. In Belgium itself the strike is making itself felt in the iron trade. About 50,000 iron workers are out and in some cases the owners have locked out men willing to remain at work, where it was seen that the object was only to earn money to assist the strikers. Nevertheless, Belgian prices are further receding. According to a Brussels dispatch they have fallen 2 to 3 marks this week and bars are being offered for export at 110 marks, f.o.b. Antwerp.

The latest reports from the Austrian trade show considerably less satisfactory conditions than hitherto. Sales have grown considerably slower. Shipments of rails, beams, heavy plates and bars in March were 20 per cent. less than for March, 1912. Orders are running so low that some of the mills have been compelled to shut down for a part of the time. Prices, however, are being pretty well maintained.

The Solingen firm Carl Prinz is in difficulties and has asked its creditors for delay till June 1, intending by that time to convert the establishment into a joint

stock company. Its troubles are due to a sharp curtailment of business through the Balkan war.

The Schulz-Knaudt Blechwalzwerk (plate mill) of Huckingen, formerly of Essen, has declared a dividend of 8 per cent., against 5 per cent. last year. The Mannesmann Roehrenwerke (tube works) of Düsseldorf pays 13½ per cent. again, as for 1912. This company is about to offer 10,000,000 marks in bonds at public subscription, after having recently increased its capital by 16,000,000 marks.

A Movement in Welsh Tin Plates

Buying for United States and the Far East—Continental Steel Billets Lower

(By Cable)

LONDON, ENGLAND, April 30, 1913.

Manipulation in Cleveland iron continues. The demand for raw and finished materials is poor. The Standard Oil Company bought 25,000 boxes of tin plates at 14s. 3d., May and June delivery, for shipment to the United States, and its brokers are still buying, but it is not known whether for the United States or the Far East. The East Asiatic Company bought 250,000 boxes at 14s. 4½d. The German Steel Works Union is not quoting on semi-finished steel but French and Belgian billets are offered at 96s., while 98s., f.o.b. Antwerp, is quoted on sheet bars. Stocks of pig iron in Connal's stores are 213,682 tons, against 210,864 tons last week. We quote as follows:

Cleveland pig-iron warrants (Tuesday), nominal at 67s. 1d., against 68s. 10½d. in the squeeze of a week ago.

No. 3 Cleveland pig-iron makers' price, f.o.b. Middlesbrough, 67s. 6d., against 69s. 3d., one week ago.

Ferromanganese, £11 12s. 3d., f.o.b. shipping port.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £5 10s.

German sheet bars, f.o.b. Antwerp, nominally 103s.

German 2-in. billets, f.o.b. Antwerp, nominally 100s.

German basic steel bars, f.o.b. Antwerp, £5 10s., a decline of 5s.

Steel bars, export, f.o.b. Clyde, £7 17s. 6d.

Steel joists, 15-in., export, f.o.b. Hull or Brimsby, £7 5s.

German joists, f.o.b. Antwerp, £5 12s. to £5 15s.

Steel strip plates, Scotch, delivered local yards, £8 7s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 15s.

Steel rails, export, f.o.b. works port, £6 15s.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 14s. 3d.

Buffalo

BUFFALO, N. Y., April 29, 1913.

Pig Iron.—The week has shown little inquiry and few sales. Users of pig are still holding off and are apparently passively awaiting a possible further sagging of prices. The few transactions reported consist of carload and small tonnage lots, with some small orders in high silicon and charcoal irons. Specifications on contracts continue to be heavy, however, with insistent demand in the malleable trade for railroad work. There is no diminution in output and the entire capacity product of furnaces is going forward into active consumption. In some quarters the agitation of labor for increased wages is having a deterrent influence as regards new placement. The Buffalo plant of the United States Cast Iron Pipe & Foundry Company has been shut down temporarily for repairs. Although prices have sagged to the schedule below, some producers are not quoting under \$16 for No. 2 X and are declining to accept the lower scale of the range. We quote as follows for second quarter and remainder of year f.o.b. Buffalo:

No. 1 foundry	\$16.25 to \$16.50
No. 2 X foundry	15.50 to 16.00
No. 2 plain	15.50 to 15.75
No. 3 foundry	15.00
Gray forge	15.25 to 15.50
Malleable	16.00 to 16.25
Basic	16.25 to 17.00
Charcoal, regular brands and analysis	18.00 to 19.00
Charcoal, special brands and analysis	21.75

Finished Iron and Steel.—The pressure for delivery of specifications is still urgent, the material being required to go into actual consumption; but new placement is considerably lighter than it has been. This is accounted for in part by the extended deliveries that the mills are making, a good many buyers seeming to feel

that nothing can be gained at this time by placing specifications for delivery in the latter part of this year or in the fore part of next. This does not apply to agricultural implement people, who are placing freely new contracts and specifications at full market prices, realizing that unless they get specifications on mill books, they will be unable to get delivery of steel when wanted. Railroad buying is large in bar and plate material and track supplies and business is also good in concrete reinforcing bars. The receivers of the New York State Steel Company have closed the entire plant temporarily on account of a strike for increased wages at the power house. This will reduce the output of semi-finished steel for the district. In fabricated structural material the demand continues brisk and a large amount of business is being figured on. The Fuller Construction Company, New York, has the general contract for the Gaiety Theatre, taking 700 tons of steel, and the John Lannen Company, Buffalo, has the contract for the Hippodrome, requiring 700 tons. August Feine & Sons have the contract for 150 tons of steel and ornamental iron for the Michael Theatre on Allen street, and the National Structural Company, Syracuse, has the steel and iron work for the gymnasium building for Union College, Schenectady.

Old Material.—The market is exceedingly dull. No local business has been done in heavy melting steel, and nothing but small transactions have been reported in any line. Prices are practically the same as for the previous week. We quote as follows per gross ton, f.o.b. Buffalo:

Heavy melting steel	\$12.00 to \$12.75
Boiler plate, sheared	15.00 to 15.50
No. 1 busheling scrap	11.50 to 12.00
No. 2 busheling scrap	9.00 to 9.50
Low phosphorus steel	17.00 to 17.50
Old iron rails	15.00 to 15.50
No. 1 railroad wrought	14.00 to 14.50
No. 1 railroad and machinery cast scrap	13.75 to 14.25
Old steel axles	17.50 to 18.00
Old iron axles	24.00 to 24.50
Old carwheels	15.00 to 15.50
Railroad malleable	13.25 to 13.75
Locomotive grate bars	10.50 to 11.00
Stove plate (net ton)	9.75 to 10.00
Wrought pipe	10.00 to 10.50
Wrought iron and soft steel turnings	7.00 to 7.50
Clean cast borings	8.00 to 8.25
Bundled tin scrap	17.00

The Buffalo sales office of the Republic Iron & Steel Company—M. E. Gregg, manager of sales—is to be moved to new and larger quarters in the White Building May 1, occupying suite 901 to 903.

New York

NEW YORK, April 30, 1913.

Pig Iron.—One large electrical interest is reported to have inquired for 2000 tons in the past week, but the business has not yet been closed. In New England a few inquiries have developed and one sale of several hundred tons was made, with other business pending. In the main the attitude of buyers is what it has been for a number of weeks. Naturally the aim will be to catch the market at the bottom, in order to equalize on deliveries now going forward, some of which are at prices \$1.50 to \$2 a ton above those of to-day. The strike at the Mt. Hope iron mine in New Jersey has resulted in the calling out of men employed on the railroad leading to this mine and the Richmond mine, so that shipments from the latter have also been cut off, interfering to that extent with the ore supply of the Thomas Iron Company. It is reported that some new low prices have been quoted in response to inquiry developing in New England. In eastern Pennsylvania there have been further sales of pipe iron, and in Virginia it is understood that pipe iron has sold at \$14 at furnace. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, \$17.50 to \$17.75; No. 2 X, \$16.75 to \$17.25; No. 2 plain, \$16.50 to \$16.75. Southern iron is quoted at \$17.50 to \$17.75 for No. 1 foundry and \$16.75 to \$17.25 for No. 2.

Structural Material.—New York is unusually dull, nor is the section tributary to this center contributing much in the way of new demand for plain or fabricated material, and railroad inquiries are not very numerous. More plain material is obtainable in six to eight weeks than recently and at 1.50c., Pittsburgh. It is doubtful that as much as usual is pending on architects' boards. The American Bridge Company has taken 1000 tons for a building at Court and Joralemon streets, Brooklyn, and 600 tons for the Singer Mfg. Company at Elizabethport, N. J. Lewis F. Shoemaker & Co. have 100 tons for a coaling station for the Central Railroad of New Jersey in Jersey City, and the Hay Foundry &

Iron Works is to erect the steel work for the National Biscuit Company, the contract including ornamental iron work. The New York Central has asked for figures for a 300-ton bridge at Spuyten Duyvil and 400 tons additional terminal area work. Quotations for mill shipments are 1.61c. and 1.66c., New York, depending largely on time of delivery, and 2.15c. from store. Shipments possible in a few weeks command \$1 and \$2 a ton additional.

Plates.—Further car purchases have been made and business still to be placed covers 20,000 to 25,000 cars, quite a little of it likely to be settled in four or five weeks. The pending business in addition to cars already noted in this column include 5000 for the Erie, of which 3000 are box cars, 1500 hoppers and 500 gondolas, and to be included in the list are 3000 for the Chesapeake & Ohio and 200 box and 200 gondolas for the Utah Railways. The Illinois Central has placed 2800 cars with the American Car & Foundry Company, which also took 250 flat cars for the Seaboard Air Line; the Eastern Car Company, New Glasgow, N. S., took 2000 box cars for the Grand Trunk, the total orders of which railroad placed with the Pressed Steel Car Company totaled 4625 cars; the Pressed Steel Car Company has also been awarded 40 flat cars for the Carnegie Steel Company, and the American Car & Foundry has been given 51 passenger equipment cars and the Pullman Company the remainder of a total of 97 for the Baltimore & Ohio. Quotations remain at 1.61c. to 1.66c., New York, for mill shipments in the fourth quarter, and 1.76c., New York, for shipment to two to four weeks.

Bars.—Jobbers, to mention one group of consumers, appear none too anxious to close for the latter part of the year, in spite of somewhat depleted stocks. There is absolutely no fear of higher prices at any time in 1913, and for the present no extended purchases are made at present prices, with heavy shipments being made constantly to them on contracts placed at 1.20c. and 1.25c., Pittsburgh. Generally there is no change from last week, which was characterized by diminished new inquiry and specifications on existing contracts. Bar iron is, if anything, weaker, more business going at 1.55c. at mill than before, with what is claimed to be refined iron obtainable also at 1.50c., mill. We quote bar iron at 1.65c. to 1.70c., New York, while steel bars remain at 1.56c. for extended delivery, with store prices at 2.05c. for steel bars and 2.10c. for iron bars.

Cast Iron Pipe.—The largest public letting in sight in this vicinity is that of Meriden, Conn., for 4000 tons on which bids will be opened May 1. Bids close to-day on 200 tons for Schenectady, N. Y., and on 26,000 ft. of 6's for Honeoye Falls, N. Y. Up to this writing John J. F. Mulcahy, of this city, who has the contract for the greater part of the extension of the New York City high pressure fire protection system, has not bought the 11,000 tons of pipe required for his section of the work. Private buying at present is slow. Prices of carload lots of 6 in. at tidewater, New York, are \$23.50 to \$24 per net ton.

Old Material.—Business is flat. A few moderate-sized transactions in heavy melting steel scrap at \$12.75 to \$13, delivered in eastern Pennsylvania, and scattered sales of small quantities of other classes of scrap comprise the only business that has come to light. Consumers having unfulfilled contracts are almost without exception asking that shipments be held up until further notice. The large steel companies are endeavoring to avoid the receipt of material in May, asking that no deliveries be made until June or July. The outlook is discouraging to those who have material to sell, as no early return of activity is apparent and prices are declining. Dealers' quotations are about as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting.....	\$10.00 to \$10.50
Heavy melting and steel scrap.....	10.00 to 10.50
Relaying rails.....	22.00 to 22.50
Rolling rails (nominal).....	13.50 to 14.00
Iron car axles.....	24.00 to 24.50
Old steel car axles.....	15.75 to 16.25
No. 1 railroad wrought.....	12.75 to 13.25
Wrought-iron track scrap.....	11.75 to 12.25
No. 1 yard wrought, long.....	11.50 to 12.00
No. 1 yard wrought, short.....	10.50 to 11.00
Light iron (nominal).....	4.50 to 5.00
Cast borings.....	7.50 to 8.00
Wrought turnings.....	7.75 to 8.25
Wrought pipe.....	10.25 to 10.75
Old car wheels.....	13.50 to 14.00
No. 1 heavy cast, broken up.....	11.00 to 11.50
Steel plate.....	8.75 to 9.25
Locomotive grate bars.....	8.00 to 8.50
Malleable cast.....	11.00 to 11.50

Ferroalloys.—A few small sales of 80 per cent. ferro-manganese have been made at \$61, Baltimore, but the market remains quiet, with not enough inquiry to

bring out resale lots. Deliveries of low percentage grades of ferrosilicon are freer as a result of the improved railroad conditions in the Middle West. Ferrosilicon, 50 per cent., is unchanged at \$75, Pittsburgh, for carloads, \$74 for 100 tons and \$73 for 600 tons and over.

Metal Market

NEW YORK, April 30, 1913.

The Week's Prices

		Cents Per Pound for Early Delivery				Spelter	
		Copper, New York	Electrolytic	Tin, New York	Lead, New York	St. Louis	St. Louis
April	Lake						
24.....	15.75	15.62½	49.00	4.50	4.37½	5.60	5.45
25.....	15.75	15.62½	49.75	4.50	4.37½	5.60	5.45
26.....	15.75	15.62½	.....	4.50	4.37½	5.60	5.45
28.....	15.75	15.62½	49.55	4.50	4.37½	5.60	5.45
29.....	15.75	15.62½	49.62½	4.50	4.37½	5.60	5.45
30.....	15.75	15.62½	49.87½	4.50	4.37½	5.60	5.45

Copper is quiet, with first-hand prices maintained. Tin is dull, with the price level practically unchanged. Lead is strong at last week's advance. Spelter is weak at unchanged prices. Antimony is dull and weak because of resale offerings, and Hallett's is lower.

New York

Copper.—The market has continued quiet, with sellers comfortably sold up and buyers well supplied. The producers are holding to their prices of 15.75c. cash for Lake and 15.62½c. cash, or 15.75c. 30 days, delivered, for electrolytic, though some resale electrolytic for May delivery is offered down to 15.50c., cash, New York. There is not enough metal offered at the lower price, however, to establish the market, but the fact that some of it has not been taken emphasizes the dullness which prevails. Should any real demand develop this copper would be quickly absorbed and no more could be obtained at recessions. Interest is growing in the labor situation in the Lake copper district, where at least one smelter has shut down and others are threatened because of uneasiness on the part of smelter employees. Especial importance is attached to the threatened disturbance, which is charged to labor agitators, because of the fact that Lake copper has been none too plentiful of late and some brands are now selling up to 16c. and difficult to get at that figure. Copper exports this month reach the excellent total of 32,043 tons. Quotations in London to-day were £66 18s. 0d. for both spot and futures.

Pig Tin.—With consumers avoiding the market both as to spot and future deliveries, the week has been very dull. Practically the only business has been the buying back of contracts for future delivery made some time ago, a form of activity inspired by the prevalence of lower prices here than are quoted in London. The difference in prices has made it possible for sellers here to purchase the contracts they had made, resell the metal in London and thereby save the expense of bringing over and making a better profit possible. The situation indicates what was stated a week ago—that American consumers have overbought. Another feature of the rather unusual market conditions is that the extremely light demand has caused some sellers to anticipate May deliveries where buyers were willing. These deliveries before the time originally specified permit sellers to economize in the matter of storage charges and interest on the money tied up. Deliveries for April total 3450 tons and there is in stock and landing 2422 tons. Deliveries in April, 1912, amounted to 5400 tons. As against those for March, the April deliveries of this year are at least 2000 tons less. The quotation in New York to-day is 49.87½c., while London prices are £230 for spot and £219 10s. for futures. The arrivals this month have been 4105 tons and there is afloat 1610 tons.

Lead.—The demand has slackened and outside of two inquiries, which together call for 1300 tons, there is not much doing. Prices are firm at 4.50c., New York, and 4.37½c., St. Louis.

Spelter.—With very little business, spelter is weak at 5.60c. to 5.65c., New York, and 5.45c. to 5.50c., St. Louis.

Antimony.—Eagerness to sell resale lots of Hallett's has led to lower prices for that brand, and 8.12½c. to 8.50c. is now quoted and the trade is pessimistic and says that some sellers would accept practically any price offered. Cookson's is quoted at 9c. and Hungarian and Chinese grades at 7.50c. to 7.62½c. Consumers continue well supplied and the offerings at concessions tend to make the market even softer than it is.

Old Metals.—The demand is light. Dealers' selling prices remain unchanged as follows:

	Cents per lb.
Copper, heavy and crucible	15.25 to 15.50
Copper, heavy and wire	14.75 to 15.00
Copper, light and bottoms	13.75 to 14.00
Brass, heavy	10.00 to 10.25
Brass, light	8.50 to 8.75
Heavy machine composition	13.75 to 14.00
Clean brass turnings	8.75 to 9.00
Composition turnings	11.50 to 12.50
Lead, heavy	4.00
Lead, tea	3.75
Zinc, scrap	4.75

Chicago

APRIL 29.—The sharpest change of the week in metal prices was the advance of \$4 a ton in lead. This was preceded by rather heavy buying in anticipation of the higher price. Copper quotations showed an improved tone. The usual variation in tin prices throughout the week resulted in a fractional net loss. We quote as follows: Casting copper, 15.50c.; Lake, 15.75c., in carloads for prompt shipment; small lots, $\frac{1}{4}$ c. to $\frac{3}{4}$ c. higher; pig tin, carloads, 50.50c., small lots, 52.50c.; lead, desilverized, 4.50c. to 4.55c.; corroding, 4.75c. to 4.80c. for 50-ton lots; in carloads, $2\frac{1}{2}$ c. per 100 lb. higher; spelter, 5.75c. to 5.85c.; Cookson's antimony, 10.50c., and other grades, 9.75c., in small lots; sheet zinc is \$7.75, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying price for less than carload lots: Copper wire, crucible shapes, 13.75c.; copper bottoms, 12.50c.; copper clips, 13.25c.; red brass, 12.75c.; yellow brass, 9.50c.; lead pipe, 3.90c.; zinc, 4.35c.; pewter, No. 1, 33c.; tinfoil, 38c.; block tin pipe, 44c.

St. Louis

APRIL 28.—Lead has stiffened up a little and closed the week at 4.37 $\frac{1}{2}$ to 4.40c. bid and 4.45c. asked. Spelter is weaker and quotable around 5.40c., with little doing; tin, lower at 49.95c. to 50.35c.; Lake copper, unchanged at 16.22 $\frac{1}{2}$ c.; electrolytic copper, 16.10c.; antimony, unchanged at 9.35c. Joplin ore production was kept to a high level as a result of the good weather which enabled the unwatering of more mines. The price of zinc blende was \$40 to \$44 per ton on the assay basis of 60 per cent. metallic zinc, while the choicest lots brought as high as \$47. Calamine was sold at \$19 to \$21 assay basis of 40 per cent., with the choicest lots selling for \$25. Lead production was increased, running to about 1000 tons for the week and the price was very firm at \$53.50 on assay basis of 80 per cent. metallic lead. We quote miscellaneous scrap metals as follows: Light brass, 6c.; heavy brass and light copper, 9.50c.; heavy copper and copper wire, 11c.; zinc, 3.50c.; lead, 3.50c.; tea lead, 3c.; pewter, 25c.; tinfoil, 34c.

Iron and Industrial Stocks

NEW YORK, April 30, 1913.

Unfavorable influences having continued to predominate, the stock market has shown an almost continuous decline. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Am. Can, com.....	30 $\frac{1}{2}$ - 35	Nat. En. & St., com.	12 $\frac{1}{4}$ - 14
Am. Can, pref.....	91 - 95	Nat. En. & St., pref.....	84
Am. Car & Fdy., com.	48 - 50 $\frac{1}{4}$	Pressed Steel, com.....	23 $\frac{1}{4}$ - 26
Am. Car & Fdy., pref.	114 $\frac{1}{2}$ - 114 $\frac{3}{4}$	Railway Spring, com.	28 $\frac{1}{4}$ - 31 $\frac{1}{2}$
Am. Loco., com.....	33 $\frac{1}{4}$ - 35 $\frac{1}{4}$	Railway Spring, pref.....	97
Am. Loco., pref.....	103 - 103 $\frac{1}{2}$	Republic, com.....	22 - 24 $\frac{3}{4}$
Am. Steel Foundries	30 $\frac{1}{4}$ - 34	Republic, pref.....	82 - 83 $\frac{1}{2}$
Bald. Loco., com....	44 - 46	Rumely Co., com.....	21 $\frac{1}{2}$ - 30 $\frac{1}{2}$
Bald. Loco., pref....	104 $\frac{1}{2}$ - 104 $\frac{3}{4}$	Rumely Co., pref.....	49 - 72
Beth. Steel, com....	32 $\frac{3}{4}$ - 34	U. S. Steel, com.....	58 $\frac{3}{4}$ - 62 $\frac{3}{4}$
Beth. Steel, pref....	69 - 71 $\frac{1}{2}$	U. S. Steel, pref.....	107 - 108 $\frac{1}{2}$
Case (J. I.), pref....	99 $\frac{1}{4}$ - 100 $\frac{1}{2}$	Va. I. C. & Coke.....	46 $\frac{1}{2}$
Colorado Fuel.....	31 - 33 $\frac{1}{4}$	Westinghouse Elec.	60 $\frac{1}{4}$ - 64 $\frac{1}{2}$
Deere & Co., pref....	95 $\frac{1}{2}$ - 97	Am. Ship, com.....	51
General Electric....	137 $\frac{1}{2}$ - 140 $\frac{1}{4}$	Chic. Pneu. Tool.....	49 $\frac{1}{2}$ - 50 $\frac{1}{4}$
Gr. N. Ore Cert.....	31 $\frac{1}{4}$ - 35	Cambria Steel.....	49 $\frac{1}{4}$ - 50 $\frac{1}{4}$
Int. Harv., com.....	103 $\frac{1}{4}$ - 104	Lake Sup. Corp.....	26 $\frac{1}{4}$ - 27 $\frac{1}{2}$
Int. Harv., new.....	101 - 104 $\frac{1}{2}$	Pa. Steel, pref.....	68 $\frac{1}{2}$ - 72 $\frac{3}{4}$
Int. Harv., pref.....	112	Warwick.....	27 $\frac{1}{2}$
Int. Harv., new, pref.	112	Crucible Steel, com....	14 $\frac{1}{2}$ - 15 $\frac{1}{4}$
Int. Harv. Corp.....	101	Crucible Steel, pref.	87 $\frac{1}{2}$ - 91
Int. Harv. Corp, pref.	112 $\frac{1}{2}$ - 113	Harb Walk Ref, com.	47 $\frac{1}{2}$ - 47 $\frac{3}{4}$
Int. Pump, pref.....	38 $\frac{1}{2}$	La Belle Iron, com....	44 $\frac{1}{2}$ - 50 $\frac{1}{2}$
Lackawanna Steel ..	37 - 41 $\frac{1}{4}$	La Belle Iron, pref.	125 $\frac{1}{4}$ - 126 $\frac{3}{4}$

The Republic Iron & Steel Company has appropriated \$1,000,000 out of surplus earnings for the retirement of a similar amount of its \$3,000,000 collateral trust notes.

Dividends Declared

The Lackawanna Steel Company, regular quarterly, 1 $\frac{3}{4}$ per cent. on the preferred stock, payable June 1. All the preferred stock but 100 shares is held in the company's treasury for the conversion of bonds.

At the monthly meeting of the directors April 24 no action was taken as to a dividend on the common stock, contrary to the general expectation.

The Pressed Steel Car Company, regular quarterly, 1 $\frac{3}{4}$ per cent. on the preferred stock, payable May 21.

The J. G. Brill Company, regular quarterly, 1 $\frac{1}{4}$ per cent. on the preferred stock, payable May 1.

The Pope Mfg. Company, regular quarterly, 1 $\frac{1}{2}$ per cent. on the preferred stock, payable April 30.

The Emerson-Brantingham Company, regular quarterly, 1 $\frac{3}{4}$ per cent. on the preferred stock, payable May 1.

The Standard Sanitary Mfg. Company, regular quarterly, 1 $\frac{1}{2}$ per cent. on the common and 1 $\frac{3}{4}$ per cent. on the preferred stock.

The United States Steel Corporation, regular quarterly, 1 $\frac{3}{4}$ per cent. on the preferred stock, payable May 29, and 1 $\frac{1}{4}$ per cent. on the common stock, payable June 28.

The Taylor-Wharton Iron & Steel Company, regular quarterly, 1 $\frac{3}{4}$ per cent. on the preferred stock, payable May 1.

The Pittsburgh Steel Company, regular quarterly, 1 $\frac{3}{4}$ per cent. on the preferred stock, payable June 2.

Titanium in Cast Iron

A good many experiments have been made to ascertain the effect of titanium on cast iron. Below is a tabulation made by a European journal of the results obtained by various investigators:

Investigator:	Ferrotitanium used	Increased—	
		tensile strength, per cent.	transverse strength, per cent.
Rossi	Alloy	30 to 50	20 to 25
Schiemann	Thermit	30 to 50	
Rossi	Alloy	6 to 30	17 to 23
Goldschmidt	Thermit	4 to 16	1 to 17
Moldenke	Alloy		18 (white)
Moldenke	Alloy		52 (gray)
Guillier	Alloy		49 (mal. castg.)
Guillier	Alloy		14 to 30 (gray)
Feise	Alloy		35
Treuheit	Thermit and alloy..		No important change.
Gale	Alloy		10 to 20
Alexander	Alloy		Increased ductility
Geiger	Alloy	12 to 26	6 to 10
West	Alloy		27 to 32
Stoughton	Alloy		10 to 43

Castings of the bronze tablet to commemorate the battleship Maine, made from metal taken from the vessel before she was towed out of Havana Harbor to her last resting place, are being made in the bronze and wrought iron works of John Williams, Inc., at 556 West Twenty-seventh street, New York. The tablets, according to an act of Congress, will be distributed to municipalities and historical societies that make application for them, paying the actual cost of production. They measure 13 x 18 in. and weigh 12 lb. Charles Keck is the designer. The metal relics selected for the tablets have been found to be of the proper mixture of copper and brass to form a perfect bronze, and the casts will be made directly from the metal without the addition of tin or other substance. The quantity available is about 16 tons.

The Gilson Mfg. Company, Port Washington, Wis., manufacturing stationary and portable gasoline engines, has established a wholesale branch, distributing agency and warehouse at Minneapolis, Minn., in charge of W. C. Becker, with S. V. Wood as assistant manager. This is the first of a group of new distributing stations to be established by the company, which is enlarging its works and greatly increasing its output.

The additional orders for rails recently booked by the Tennessee Coal, Iron & Railroad Company insure the operation of the rail mill at Ensley, Ala., for several months, and it is probable there will not be a summer shutdown.

The five new sheet mills of the American Sheet & Tin Plate Company at its Mercer works, Farrell, Pa., will be completed in October. It was decided some time ago to dismantle the Bray continuous mill at this plant.

Personal

I. Schoenawa, for 16 years identified with the Röchling Eisen und Stahlwerke, Völklingen, Germany, 6 years in charge of operations, including rolling mills, basic converters and blast furnaces, is now in this country at the plant of the Crucible Steel Casting Company, Lansdowne, Pa., where there is a Röchling-Rodenhauser electric furnace. He is to return to Europe on May 10.

J. P. Phillips, manager of the Elkins Foundry & Machine Company, Elkins, W. Va., has resigned, effective May 1, and will go to Toronto, Canada, to become engineer with the National Iron Works.

Frank W. Bowers, secretary and treasurer of the Wheeling Steel & Iron Company, Wheeling, W. Va., has resigned to become associated with his son, George Bowers, owner of the Mannington Pottery Company, Mannington, W. Va. He is succeeded by Charles J. Hunter, purchasing agent, who in turn is succeeded by Earl Adams, formerly assistant manager of the Pope tin plate plant at Steubenville, Ohio.

S. S. Knight, vice-president and general manager of the Scullin-Gallagher Iron & Steel Company, St. Louis, has tendered his resignation because of ill health. Acceptance of the resignation has not been considered, but Mr. Knight will make an extended trip to California to recuperate.

George M. Harden, for a number of years treasurer of the Philadelphia Pipe Bending Company, Philadelphia, has resigned his position with that company and will continue in the same line as district sales agent for the Whitlock Coil Pipe Company, Hartford, Conn. He has established offices at 518 Drexel Building, Philadelphia, for the sale of the various products of this company, and will also handle a complete line of steam specialties.

Henry B. Lupton, vice-president Oliver Iron & Steel Company, has returned to Pittsburgh from a two and a half months' rest in the South, owing to ill health. While his condition is considerably improved, he does not intend to engage in active business for several weeks.

A. D. Heyl, formerly assistant manager of the H. W. Caldwell & Son Company at New York, has become connected with the Quigley Furnace & Foundry Company, Springfield, Mass., and will handle powdered coal furnaces and equipment. He has been in the coal-handling and conveyor business for a number of years.

H. B. Kraut, of the export department of Joseph T. Ryerson & Son, Chicago, will sail for Europe May 6 in the interests of the company's foreign business.

John C. Williams, former manager for the Phillips Sheet & Tin Plate Company at Clarksburg, W. Va., has been appointed assistant to the president in charge of operating departments, with office at Weirton, W. Va., and assumes the position May 1. E. L. Cronmeyer, who has been associated with the company for many years, has been appointed special agent. H. G. Crisler, former assistant manager of the Weir plant has been appointed manager of the Clarksburg mills. E. M. Mentzer, as previously announced, has been made manager of the Pope plant at Steubenville, Ohio.

J. J. Gray, Jr., Rockdale, Tenn., has appointed A. F. Plock, Park Building, Pittsburgh, Pa., engineer to prepare plans and specifications and superintend the construction of four hot blast stoves and draft stack, also hot blast main, cold blast main and bustle pipe. The hot blast main will be equipped with Scott expansion joints. The stoves will be 16 x 65 ft., of the White & Kernan type, and the stack 6 x 150 ft.

Julian Kennedy, Pittsburgh, has been engaged to design a new pumping station for the city water works service of Youngstown, Ohio. The new station was decided upon after the recent flood which put 9 ft. of water over the floor of the present source of water supply of the city.

John Wiley & Sons, Inc., industrial publishers and book sellers, have removed from 43 and 45 East Nineteenth street to the eighth floor of 432 Fourth avenue, corner of Twenty-ninth street, New York.

Obituary

ISAIAH TOWNSEND BURDEN died suddenly April 23 at his home in New York City, as the result of a stroke of apoplexy, aged 75 years. He was born in Troy, N. Y., and was a son of Henry Burden, the inventor of machinery for making horseshoes. He was educated in the common schools of Troy and at Russell's Academy, at New Haven, Conn., and began his business career as a partner in Henry Burden & Sons, at Troy, manufacturers of bar iron, horseshoes and rivets. In 1881, with his brother, James A. Burden, he organized the Burden Iron Company, in which he held a half interest, to take over the business of Henry Burden & Sons, their father having died. He was once president of the Port Henry Iron Ore Company, and at the time of his death was a trustee of the Lake Champlain & Moriah Railway Company and a director of the Burden Iron Company. He was one of the organizers of the Knickerbocker Trust Company, New York, and retained a large interest in that institution. He was a member of several clubs. Besides his widow, he leaves a son and two daughters.

The American Road Machinery Company, Kennett Square, Pa., has been formed and has purchased the entire properties of the American Road Machine Company, Climax Road Machinery Company, Indiana Road Machine Company, Monarch Road Roller Company and Lima Contractors' Supply Company. These companies will be operated along the same lines as heretofore and the active management will continue without change. The new company was formed to increase the efficiency of operation and to handle an increased demand for this line of goods promptly.

The Kelly Reamer Company, Cleveland, Ohio, held its annual meeting April 19, at which the following directors and officers were re-elected: William E. Kelly, president and general manager; W. A. Calhoun, vice-president; H. J. Maxwell, secretary; O. H. P. Davis, treasurer; George Bauer, T. A. Torrance, E. B. Jessup. The company reports a greatly increased demand for its product, necessitating overtime operations the past four months.

President L. E. Johnson of the Norfolk & Western announces that it is arranging to electrify its line from Eckman to Bluefield, W. Va., and that the preliminary work for this is now under way. It is possible that power will be obtained from the Appalachian Power Company.

The Andrews & Hitchcock Iron Company, Hubbard, Ohio, has purchased 28 acres of land adjoining its blast furnace site, but there is no intention of building a steel plant or of adding to the furnace plant, as reported.

The Ed. H. Callaway Engineering Company, specializing in clay and brick, has removed from 30 Church street to 1712-14-16 Woolworth Building, Broadway and Park place, New York.

The Sharon, Pa., plant of the American Steel Foundries, which has been idle for two years, resumes operations this week. The product will be chiefly light car castings.

The Nova Scotia Steel & Coal Company, New Glasgow, Nova Scotia, has secured a large contract for its high-grade iron ore from the Krupp works at Essen, Germany.

Wright, Schooley & Morse, engineers and auditors, 300 Fifth avenue, New York, have removed to the Woolworth Building, Broadway and Park Place, New York.

The corporate name of the Sterling Emery Wheel Mfg. Company, Tiffin, Ohio, has been changed to the Sterling Grinding Wheel Company.

The New York office of the Chisholm & Moore Mfg. Company has been removed from 103 Chambers street to 30 Church street.

Pittsburgh and Vicinity Business Notes

The Metallurgical Testing Laboratories Company has been organized recently and has established laboratories in the Manufacturers' Building, Pittsburgh. The company has fully equipped chemical, physical, heat treatment and microscopical departments and its purpose is to serve manufacturers or consumers in the buying of materials, the processes of manufacture and in selling demonstrations. The plan of the company is to furnish the service of any or all of its various departments covering the field of commercial testing as well as that of specialized research work. Cyrus M. Avery is president; Dr. Fritz Cremer, vice-president; William F. Fusting, treasurer, and Charles G. Lamb, secretary.

At Sharon, Pa., April 23, A. R. McGill was appointed receiver of the Sharon Boiler Works, W. W. Schilling, president of the company, concurring in the action. The plant will be operated for the present by the receiver.

The Thomas Carlin's Sons Company, Pittsburgh, is building two 7-ft. self-discharging grinding pans, with electric motors, for the Standard Steel Works Company, one wet and one dry grinding pan, etc., for the Carnegie Steel Company and a No. 3 motor-driven shear for the Niles-Bement-Pond Company, having a capacity to cut 4 in. square. Orders are coming in quite freely.

W. N. Kratzer & Co., Pittsburgh, have recently entered a number of contracts for structural steel work, among which is one with the American Steel Foundries for its plant at Sharon, Pa., covering an open-hearth furnace building, a main foundry building, a machine shop building and two sand blast houses. Another is with the Carbon Steel Company, Pittsburgh, Pa., for a universal mill building, 66 ft. 3 in. x 387 ft. 6 in., to be covered on sides and roof with galvanized corrugated iron and to have a traveling crane running the full length of the building. Less important contracts are for various points extending from Atlantic City to Milwaukee.

The Riter-Conley Mfg. Company, Pittsburgh, Pa., is now working on the 400-ft. extension of machine shop No. 10 of the General Electric Company at Erie, Pa., which will take 1200 tons of steel. It is just beginning on a contract for the Erie Construction Company at Altmar, N. Y., for 1198 ft. of 11 ft. 6-in pipe and 206 ft. of 12-ft. pipe, and other work designed for the hydroelectric power plant of the Salmon River Power Company in Oswego County, New York, requiring in all 1200 tons. The company is also doing extensive tank work for Mexican oil interests to go to the Tampico district. It has done considerable in transmission towers recently, having shipped 200 for the Pearson Engineering Corporation, 100 for the Ebro Irrigation & Power Company, 150 to the United Gas & Electric Company, Lancaster, Pa., and next month 445 will be turned out for the Salmon River Power Company. For the Algoma Steel Company, Sault Ste. Marie, Ont., it has an order for steel plate work, hoist frame work and other construction for a cupola 12 ft. in diameter and 30 ft. high; also an order from the Deforest Sheet & Tin Plate Company, Niles, Ohio, for structural steel work for an engine house, 45 x 60 ft., and an addition to its large mill building.

The J. H. Hillman & Sons Company, Pittsburgh, has added a coal department to its coke and pig iron business. In addition to the sale of its own product of Pittsburgh coal and Connellsville coke, it will buy and sell gas and steam coal. G. W. Wilson, now associated with the company, will have charge of the coal department. Mr. Wilson was formerly a resident of Pittsburgh, but in the past two years has been located in Philadelphia.

The Jos. Soisson Fire Brick Company, Connellsville, Pa., has installed a 150-hp. Erie boiler at its Volcano works and a 125-hp. Erie boiler at its Davidson works, in addition to machinery and new kilns provided at its Moyer, Kingston and Columbia plants.

The Columbia Steel & Shafting Company, Pittsburgh, manufacturer of Columbia turned and polished shafting, cold-drawn screw stock and special shapes, has opened a branch sales office in room 311 Weightman Building, Philadelphia, with Joseph T. Somers in charge.

Wickes Brothers, Saginaw, Mich., dealers in and manufacturers of machinery, factory and mill equipment, have

opened an office in the Empire Building, Pittsburgh, with F. E. Beach as manager.

The Flood City Mfg. Company, Johnstown, Pa., maker of brass, bronze, acid metals and aluminum parts for electric locomotives, has bought a new site, 110 x 120 ft., on which larger buildings will be erected, the business of the company having outgrown its present quarters. The capital stock has been increased from \$15,000 to \$25,000.

The Latshaw-Bradley Machinery Company, Peoples Bank Building, Pittsburgh, has been appointed local representative for the Emery Machinery Company, Beaver, Pa., manufacturer of direct-connected gas compressors.

The Barnes Safe & Lock Company, Pittsburgh, has bought a site at Washington, Pa., on which it will build a new plant. The plans provide for one building, 60 x 300 ft.; one, 60 x 80 ft., and three 40 x 40 ft. The company has arranged to purchase electric power and all machines will be motor driven. It has been engaged in the manufacture of safes at 325 Third avenue, Pittsburgh, since 1845, and has outgrown the capacity of its present quarters. An office and salesroom will be maintained in Pittsburgh. T. Barnes Newell is president and John A. Newell is secretary and treasurer.

While the blast furnace of the Clinton Iron & Steel Company was being blown out for relining the stack collapsed. The company has placed an order with the Riter-Conley Mfg. Company for the steel work for rebuilding the stack and work will be rushed as fast as possible. It will probably be in operation again in about 90 days. This is the oldest furnace in Pittsburgh.

Phillips Sheet & Tin Plate Improvements

The Phillips Sheet & Tin Plate Company, having a tin plate plant at Weirton, W. Va., containing 20 hot tin mills, has decided to add a sheet rolling department with 10 or 12 hot mills, the exact number not yet being determined. The company is building a power plant on a new location to replace the one damaged some time ago by a landslide, which will have 7000 hp. Sterling water tube boilers, an increase of 3000 hp. over the old plant, and it will also have an electrical plant of 5000 hp., the latter to drive the new sheet mills. A galvanizing plant will also be built, and the company will then make black and galvanized sheets.

No contracts have yet been placed for the new mills and other equipment, but will probably be given out in a short time. The additional boilers will take care of the new sheet mills. The tin plate mills which have been closed since early in March on account of the accident to the power plant, will soon be in operation again. The company expects to put on to mills about May 10 and the other 10 two weeks later. At the company's Pope tin plate mill at Steubenville, Ohio, it is adding 1000 hp. of Sterling water tube boilers.

Fast progress is being made in the building of the new plant of the Weirton Steel Company at Weirton, this being an identified interest of the Phillips Company, and it is to be ready for operation about June 1. It will turn out cold-rolled strip steel and other cold-rolled steel specialties.

The Browning Engineering Company, Cleveland, Ohio, has received an order from the Canadian Pacific Railroad for a 100-ton wrecking crane and an order from the Pennsylvania Steel Company for a 75-ton wrecking crane. The Browning Company has commenced the erection of wrecking cranes for stock so that buyers will be able to secure prompt deliveries instead of waiting three or four months until a crane can be built.

A slag crushing and screening plant is being installed at the Ohio works of the Carnegie Steel Company at Youngstown, Ohio. It will have a capacity for handling 20 carloads of slag a day, the product being devoted in part to the manufacture of cement while other portions will be used for road making and for railroad ballast.

As a part of its "Safety First" movement, the H. C. Frick Coke Company, subsidiary of the United States Steel Corporation, has begun a series of motion picture exhibitions which will be presented at every plant in the Connellsville coke region.

Vanadium in Locomotive Springs

The Illinois Central Railroad has completed some comparative tests of carbon and vanadium steel driving and engine truck springs. Sets of each kind of springs were applied to two 10-wheel locomotives of the same class, operated under the same conditions. The springs were of the same design. The following table will show the results:

	Carbon	Chrome vanadium	Per cent in favor of latter
Driving springs	42,145 miles	146,587 miles	248
Engine truck springs	34,635 miles	79,567 miles	129

The records show that because of their longer service the chrome-vanadium springs cost from 31 per cent less in the case of engine truck springs to 54 per cent less for driving springs per unit of service. The complete records cover a period of over 2½ years of service. The increased requirements resulting from heavier equipment are causing increased spring failures, one road reporting as high as 1000 per month.

The World's Production of Copper in 1912

The world's production of copper in 1912, according to Henry R. Merton & Co., Ltd., London, England, was 1,004,485 gross tons. This is by far the largest output ever attained, comparing with 871,920 tons in 1911 and 864,275 tons in 1910. A gain of 250,000 tons has been made in the past five years. A table giving the production by countries, from 1893, has been printed by the firm named in which 24 sources of production are enumerated. The countries having an output of over 20,000 tons in 1912 are as follows in the order of quantity produced: United States, Mexico, Japan, Spain and Portugal, Australasia, Chile, Canada, Russia, Peru and Germany. The United States made more than half the total, being credited with a production of 554,835 tons. No other country came anywhere near this production, the second in line being Mexico with 70,845 tons.

An interesting traveling gantry for bridge erection in India was recently constructed by P. & W. Maclellan, Ltd., Glasgow, from the design of Rendel & Tritton, of London. The gantry is designed to lift four 7½-ton loads simultaneously at 30 ft. per min.; and when lifting these loads and while subjected to a wind pressure of 15 lb. per sq. ft., the crane must be able to travel at a speed of 10 ft. per min., but when there is no wind at a speed of 30 ft. per min. The traveler had to be erected at the shop and re-erected in India, and most of the joints were connected by turned and taper bolts, though a small amount of riveting was done in the erecting shop.

Electrically driven ships are now being built in England for service on Canadian canals. One was recently launched at Middlebrough, and, according to the Engineer of London, the primary power plant consists of two Diesel oil engines, each 300 hp. brake rating. The ship mentioned is 250 ft. long. The type of drive was selected because, notwithstanding the frequent stopping and reversing, it is unnecessary to stop or reverse the oil engine.

The buildings of the Canton Iron & Steel Company, Baltimore, Md., having been practically destroyed by fire April 23, plans as to rebuilding and operating the plant will not be decided until after the insurance has been adjusted. The company manufactures iron bars and the damage to the machinery has not been determined.

W. H. Nelson & Son, Taunton, Mass., have recently completed the first year of the existence of their business and state that it was very successful. W. H. Nelson, the head of the firm, was the founder, president and superintendent of the Taunton Rivet Works. The new firm manufactures iron, brass and copper rivets and specializes in very small sizes.

Corrigan, McKinney & Co., Cleveland, Ohio, have placed an order for 23 gas producers for their new steel plant in Cleveland with the Wellman-Seaver-Morgan Company of the same city. Other contracts for machinery equipment for this plant will be placed shortly.

Estimation of Sulphur in Coal and Coke

F. Boutin in the *Revue de Metallurgie* offers a method for determining the amount of sulphur in coal or coke. It is based on the principle that organic sulphur compounds as well as mineral sulphides and sulphates when heated to redness in the presence of an excess of iron filings, give up their sulphur to form sulphide of iron and lower sulphides which liberate all their sulphur as hydrogen sulphide when treated with an acid. The details are as follows:

Weigh 1 g. of finely powdered coal or coke in a porcelain crucible and mix with 5 g. of pure iron filings. Cover this mixture with a layer of more filings to retain any traces of sulphur that might escape. The crucible with its cover is placed within a larger crucible, the free space between the two crucibles being filled with fine pieces of charcoal. The whole is then put for one hour into a muffle heated to redness. On cooling and removing the button of coke which has formed, it is broken up into small pieces. These are placed in the flask used in all steel and iron laboratories for the determination of sulphur by evolution. The crucible and mortar are carefully cleaned out by means of 2 or 3 g. of carbonate of soda to remove possible adhering traces. The soda is added to the flask, with the advantages of forcing out the air by the carbon dioxide disengaged when the acid is added. The liberated H₂S is received in a solution of acetate of zinc. The zinc sulphide is titrated with the usual iodine and hyposulphite solutions. The solutions are standardized on a known sample of coal, the sulphur content of which has been determined gravimetrically.

One operator can easily make 40 determinations in a day by this method. The following is a complete table of results obtained by this and Eschka's method:

	Eschka's method, Sulphur, per cent.	New method, Sulphur, per cent.
Coal:		
Sample 1	1.46	1.51
Sample 2	2.07	2.07
Sample 3	2.02	1.92
Sample 4	3.94	3.81
Coke:		
Sample 1	1.37	1.41
Sample 2	1.59	1.54
Sample 3	1.38	1.34
Sample 4	0.98	1.09

The Steel Company of Canada's Earnings

The report of the Steel Company of Canada for the year ended December 31, 1912, compares as follows with that for the preceding year:

	1912	1911
Profits	\$1,547,039	\$1,373,523
Bond interest	465,326	481,100
Balance	\$1,081,713	\$893,422
Reserves	150,000	100,000
Preferred dividend	454,741	454,741
Surplus	\$476,972	\$337,681

The balance sheet as of December 31, 1912, shows an excess of quick assets over current liabilities of \$5,734,193; reserves, \$472,860; surplus, \$1,060,571.

Hickman, Williams & Co., the well-known pig-iron merchants, with offices in Cincinnati, Louisville, Chicago, New York and St. Louis, have incorporated under the laws of Kentucky, with \$600,000 capital stock and a debt limit of \$1,000,000. The incorporators are A. J. Carroll and R. Baylor Hickman, of Louisville, and Frank M. Eaton, of Cincinnati.

Wickes Bros., Saginaw, Mich., have opened a new warehouse at Thirty-ninth street and Lowe avenue, Chicago, for the handling and sale of new and second-hand machinery, power equipment, machine tools, generators and motors, etc. The warehouse is located on the tracks of the Chicago Junction Railway and is readily accessible by either elevated or surface transit lines.

Though less than seven years old, the city of Gary, Ind., now has a population estimated at 40,000, the gain over 1912 being 30 per cent. The estimate is based on the new city directory, using the small multiple of 2½ because of the large proportion of men in Gary.

Labor Notes

The plant of the New York State Steel Company, Buffalo, now in the hands of receivers, has been closed temporarily, following a strike for higher wages of about two score of the engineers, firemen, stokers, oilers, etc., in the power house April 23. As time would be required to replace the licensed engineers, Judge Hazel of the United States Court, granted the receivers, Alfred L. Becker, F. Ernest Porter and Theodore Wickwire, Jr., permission to shut down the plant until the labor conditions could be adjusted.

The American Steel Foundries closed its plant at Granite City, Ill., indefinitely on April 23 as a result of a strike of 800 laborers and rammers. The strikers demanded an increase from 16½c. to 20c. per hour for the laborers and from 20 to 22c. per hour for the rammers, with 10 hours' pay for 9 hours' work. A similar strike took place at the East St. Louis works of the company, and it is stated that the work under contract at both places will be transferred to other plants of the corporation until a settlement is reached satisfactory to the company. The order to close came from John C. Davis, after consultation with President Robert P. Lamont.

Fire Resisting Cement

The American Fire Resisting Cement Company, Buffalo, N. Y., recently organized, has built and equipped a plant for the manufacture of a fire cement of high refractory quality for which strong claims are made. It is stated to be adapted for use in the building and repairing of fire brick structures which are exposed to flame heat; for the lining of blast furnaces; for use in and around hot blast stoves and mains and for making all manner of fire-proof and blast-proof joints; for building and repairing soaking pits, boiler furnaces, coke ovens and similar structures, and for patching partially burned-out iron linings. Under the action of heat this cement is said to set extremely hard, and being very plastic adheres tenaciously when applied to a hot surface. It fills joints thoroughly as it expands slightly before setting hard. Used as a wash, it imparts a glazed surface which greatly protects brick work from the action of flame. The plant of the company is at Broadway and the New York Central Railroad, West Shore Division, with offices at 76 Young avenue. Henry T. Upson is president.

The bill introduced in the Swedish Reichstag for increasing the exports of ores pertains to the exports from the Norrbotten district, which lies in the northeastern part of the country. It will amount to 31,000,000 tons in the next 20 years. The government's decision to increase exports is due to the fact that further exploration of that district shows that there are much larger deposits of ore than had been estimated. It is asserted that the supply will last for centuries. The Swedish Government is half-owner of the ore lands in the district.

The Carborundum Company, Niagara Falls, N. Y., has begun the publication of a monthly house organ, known as the Abrasive Age, devoted to the better use of abrasives. The first number contains an article on disk grinding as applied to the finishing of various kinds of parts, one on the use of garnet paper and cloth in a chair factory, and the first of a series of interesting articles on the glass industry. Reproductions are given of advertisements for a number of the company's abrasive products.

The West Virginia Equipment Company, 901 Kanawha street, Charleston, W. Va., recently incorporated, will conduct a business as manufacturers' agent and merchant engineer, specializing in mine and power-plant equipment. D. T. Prenter is president; P. Bonnell, vice-president, and P. J. Goodwin, secretary and treasurer. A number of prominent manufacturers in various parts of the country have arranged with the company for representation.

The Taylor-Wharton Iron & Steel Company has removed its offices to the Hudson Terminal Building, 30 Church street, New York.

Firebrick Makers Organize

At a meeting of about forty firebrick manufacturers recently held in the Fort Pitt Hotel, Pittsburgh, it was decided to form an organization to be known as the Refractories Manufacturing Association. Its object will be to correct some abuses that have crept into the firebrick trade, to promote closer relations between the manufacturers and to standardize as far as possible the various designs and shapes of firebrick. It is said that no attempt will be made to control prices. H. G. Savage, Ashland Fire Brick Company, Ashland, Ky., was elected president and John H. Cavender, American Refractories Company, Chicago, was elected secretary and treasurer. A committee was appointed to draw up a constitution and by-laws and it is probable that the organization will apply for a charter. Another meeting is to be held in Pittsburgh May 20.

In an exhibit of the extent of its operations the H. Koppers Company, Chicago, shows a total of 10,134 by-product coke and gas ovens installed or contracted for in the past 12 years. In the United States the number is 1527, of which 1492 are coke ovens and 35 combination gas and coke ovens. These figures include 312 ovens for which contracts were placed last year—92 for the Minnesota Steel Company, Duluth; 80 for the Woodward Iron Company, Woodward, Ala.; 6 for the Maryland Steel Company, Sparrows Point, Md.; 66 for the Inland Steel Company, Indiana Harbor, Ind., and 68 for the Republic Iron & Steel Company, Youngstown, Ohio.

The Trumbull Steel Company, Warren, Ohio, expects its plant, now under construction and to be ready for operation in July, to have an annual capacity of 50,000 tons of sheets and tin plates. It is stated that the hot mills will be interchangeable for either sheet or tin plate. The rolls are 30 in. in diameter, which is unusual, as the ordinary size is 26 to 28 in. They will be sufficiently long to turn out a sheet 54 in. in width. Jonathan Warner is president; Philip Wick and W. L. Hardesty, vice-presidents; D. W. Kerr, secretary and treasurer; William Ward, general manager, and George Thomas, general sales manager.

The Garford Engineering Company, recently incorporated by Arthur L. Garford, Elyria, Ohio, and others, has secured the American rights for the manufacture of an alloy of aluminum, known as aeromin, which is controlled by an English corporation known as the Aero Metal Syndicate. It is stated that this alloy can be successfully used in making castings for crank cases and transmission boxes for automobiles, for cooking utensils, for plumbing goods and for various purposes for which brass and gun metal are used.

At a meeting of the Tioga Steel & Iron Company of Philadelphia, recently acquired by the Taylor-Wharton Iron & Steel Company, the following were elected directors: Knox Taylor, A. E. Borie, W. L. Wright, L. W. Jones, W. A. Ingram. On organization they elected the following officers: President, Knox Taylor; vice-presidents, A. E. Borie, W. L. Wright, L. W. Jones; secretary and treasurer, W. A. Ingram; assistant secretary and assistant treasurer, W. J. Ogden.

The No. 1 blast furnace of the Detroit Iron & Steel Company, Detroit, Mich., was blown out April 24 for repairs. Among other improvements a gas washer will be installed and new bins and trestles will be erected.

The Merrill Iron Works, Merrill, Wis., has enlarged its field of operation to the extent of carrying a stock of mill, engineering and blacksmith supplies in addition to its present foundry and construction business.

Fifty-seven manufacturers of Marion, Ind., held an industrial exposition, April 19-26, under the auspices of the Civic Assembly. It was largely attended.

New Tools and Appliances

This is essentially a news department for which information is invited

Test Indicator.—An indicator designed to be adapted for all classes of work is being made by the C. E. Robinson Company, Orange, Mass. There is a reversible dial with English graduations on one side and metric on the other, which can be adjusted at any desired angle to facilitate reading when the indicator is fastened to the binding post of a surface gauge.

Four Plane Shell Drilling Machine.—The Langelier Mfg. Company, Providence, R. I., has designed a special machine for simultaneously drilling four 3/32-in. holes spaced 90 deg. apart through the walls, and 1/2 in. from the end of a brass shell 0.410 in. in diameter and 2 1/2 in. long. The machine consists essentially of four drilling spindles at a convenient height for the operator near the top of a vertical column, the spindle driving pulleys and a treadle being located at the base. The four spindles are simultaneously set against the work by pressing the foot treadle which imparts a quarter revolution to a cam and draws in the spindles by engaging a roller on the spindle frame. The spindles which are practically floating ones operate at a speed of approximately 2700 r.p.m. with a countershaft speed of 575 r.p.m. and carry a No. 11 Skinner chuck for taking drills up to a maximum diameter of 7/32 in. An endless leather belt drives the four spindles and is kept at proper tension by adjusting a large idler pulley at the side of column vertically and clamping it in place by a single cap screw. The work is held in a hardened and ground steel snap bushing which at the same time serves as a guide bushing for each drill. The over-all height of the machine is 69 in., the floor space occupied is 24 x 28 in., and the weight is 570 lb. A greater or lesser number of spindles can be spaced radially around the work, if desired, and the holes can also be staggered. The builder's multiple drilling heads may be used in place of single spindles.

Keyless Drill Chuck.—A recent product of the Gronkvist Drill Chuck Co., 18 Morris street, Jersey City, N. J., is a new keyless ball bearing drill chuck. The chuck consists of a knurled operating sleeve which is in one piece with a threaded shank that is slotted to receive three tapered jaws. These jaws fit in radial slots in the threaded shank and are normally kept open by a light annular steel wire spring. When the drill is inserted between the jaws the knurled sleeve is turned and the sleeve and the jaws turn together and the latter grip the drill shank, the resistance caused by drilling having a tendency to close the jaws still tighter. To release the drill the knurled sleeve is turned in the opposite direction, a mere touch being all that is required. Three sizes of chuck are made for gripping drills up to a maximum of 3/8 in.

Automatic Machine for Making Pinions.—For making electric meter and watch pinions and similar work directly from rod stock, the Sloan & Chace Mfg. Company, Newark, N. J., has developed an automatic machine. It will take stock up to 0.3 in. in diameter and will make pinions up to 1/2 in. long with any number of teeth complete with a double cut, a roughing and a finishing one one through the teeth. In designing these machines it was intended to have them run in groups of from four to six for a single operator. The different cutters of the turret for turning the rods to size and the gear cutter for machining the teeth are controlled by a cam mechanism, the accuracy of the tooth spacing being regulated by a ratchet and pawl arrangement. The cams, which together with the spindle are driven from a self-contained countershaft that can be fastened in any convenient location, bring about the various operations at the proper time. A complete brass pinion of the maximum size turned out by the machine has been made in 45 sec.

Lathe Motor Drive.—The Nordberg Mfg. Company, Milwaukee, Wis., has adopted the method of mounting the driving motor for a lathe on a shelf over the headstock. This method of mounting can be used for either a single pulley or the regular cone pulley head and the desired belt tension is maintained by varying the position of the motor-supporting shelf which is pivoted. The special features of this arrangement are a short belt, ease of

access for oiling or repairs to the motor and a small cost for belting.

Planing Machine Tools.—The Henry G. Thompson & Son Company, New Haven, Conn., has recently designed a new planing machine tool, consisting of a holder in which a high-speed steel cutter is mounted. The holder is made up of three parts, the shank, the cap and the bolt, and there is a dovetail socket between the holder and the cap into which the cutter fits, the side being properly ground. Where a very narrow stock is used for the cutter, the shoulder on the cap fits over the edge and in some cases an adapter and a block are used to bring the cutter into the right position. Six different sizes of tool holders with shanks ranging from 3/4 x 1 1/4 x 8 1/2 in. to 2 1/8 x 2 3/4 x 22 in. are made for either right or left hand use.

Knee Operated Drilling and Tapping Machine.—The Sloan & Chace Mfg. Company, Newark, N. J., has recently brought out a drilling and a tapping machine, both of which are designed to be operated by the pressure of the knee, thus leaving both hands free to handle the work. The hardened steel spindle of the drilling machine is finished by grinding and is tapped. The maximum diameter of the tap accommodated by the chuck is 3/16 in., the machine possessing ample power to drive it. The driving and reversing pulleys which are 3 3/4 and 2 3/4 in. in diameter respectively are driven by a single 1/4-in. belt, the pulley running on sleeves to prevent wear on the spindle. The distance from the column to the center of the table is 3 in. and that from the chuck to the table when at its lowest position is 2 3/4 in. For reversing the tap an adjustable stop is provided. The 1/2-in. hardened steel spindle of the tapping machine is finished by grinding and lapping and runs in a bronze bushing. Ball thrust bearings and an idler pulley are provided, so that the machine can be run either from above or below. Like the drilling machine, the spindle of this machine is driven by a 1/4-in. round belt and the maximum size of tool handled is 3/16 in. The speed of the spindle is 6000 r.p.m. The distance from the column to the center of the table is 3 in. and that from the chuck jaws to the table when at its lowest position on the column is 3 1/2 in. Both of the machines are provided with adjustable stops so that holes may be drilled and tapped to a predetermined depth.

Gasoline Rock Drills.—The Scott Drill Company, St. Louis, Mo., has brought out a hammer type of gasoline rock drill, which has an average fuel consumption of 2 gal. of gasoline per 10 hours. It is claimed for this drill that with 3 hp. the same amount of work can be done as will be accomplished by an air drill requiring 20 hp. In this drill the steel is not reciprocated, but is constantly in contact with the material that is being drilled, while it is struck by a reciprocating hammer. After each blow the steel is automatically rotated through a slight angle and is then struck again. Power is supplied by a two-cycle single cylinder water cooled engine. Two pistons, one mounted within the other, are employed, the outer of which is a floating hammer and strikes the hammer block that transmits the force of the blow to the drill steel.

Hand Power Lathe.—A hand lathe which is made with beds 4 and 5 ft. long and three, four or five step cone pulleys, has just been placed on the market by the Grant Automatic Machine Company, Detroit, Mich. The bed and the headstock of this machine are cast in one piece and the bearings are lined with babbitt, which has been bored and scraped. The crucible steel spindle is fitted with a No. 2 Morse taper and has a 9/16-in. hole. The front spindle box is 1 1/2 in. in diameter and 3 1/2 in. long, and the thrust on it is taken by a phosphor bronze collar. Both lever and screw feed are provided for the tailstock and the former can be disconnected instantly when it becomes necessary to use the handwheel and the screw. The T-rest, of which two are furnished with each machine, is clamped to the bed by one motion.

Bench Grinding Machine.—A bench grinding machine is being built by Frank MacVicar, 214 Milton avenue, Syracuse, N. Y., which can be driven either from the ceiling or the floor. The body is a casting of box cross-section which has been designed with an aim to secure compactness and rigidity, and the tool rests are detachable. The bearings are on an angle, and to prevent end play the journal boxes are grooved.

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET

HOURS OF LABOR LAW VALID.—The provision of the New York labor law which limits the hours during which minors and women may be employed in factories to 9 hours a day and 54 hours a week is a valid exercise of the Legislature's power. (New York Supreme Court, Kings County, *People vs. Kane*, 139 New York Supplement 350.)

DAMAGES FOR SELLER'S BREACH OF CONTRACT.—The ordinary rule for measuring damages for a seller's breach of contract to deliver goods to the difference between the contract price and the market price of the goods at the time and place of delivery, with interest, does not apply when the purchaser cannot readily go into the market and supply himself with the desired goods by paying any difference in price. (Alabama Court of Appeals, *Standard Oil Company vs. Weeks*, 60 Southern Reporter 508.)

TIME FOR DELIVERY OF GOODS SOLD.—A seller sufficiently complies with a contract to ship goods "about" a certain date by shipping them two days later. (New York Supreme Court, First Appellate Term, *Hughes vs. Constantin*, 139 New York Supplement 865.)

DEFECTS IN APPLIANCES USED BY WORKMEN.—An employee injured while using defective chain tongs cannot recover, if he was an experienced workman and deemed them sufficient for his use. (New York Supreme Court, Second Appellate Division *McKeon vs. Proctor & Gamble Mfg. Company*, 139 New York Supplement 805.)

DUTY TO GUARD MACHINERY.—If an employer had no reasonable ground for deeming it necessary to guard a pulley, he is not liable for injury to a workman resulting from failure to do so. (Virginia Supreme Court of Appeals, *C. C. Smoot & Sons Company vs. Johnson*, 76 Southeastern Reporter 911.)

PRIORITY OF MORTGAGE OVER CONDITIONAL SALE CONTRACT.—Unless a mortgage of land has actual or record notice that machinery permanently installed thereon has been sold under a contract which reserves title in the seller until payment of the price, the mortgage takes precedence over the contract. (United States District Court, Western District of Arkansas, *in re W. O. Craig Mfg. Company*, 201 Federal Reporter 548.)

INJURY TO EMPLOYEE THROUGH DEFECTIVE GUY ROPE.—Risk of being injured through a defect in a hoist guy rope is not assumed by a workman, if the safety of the rope could be ascertained only by testing it by means not available to him. (Wisconsin Supreme Court, *Bruce vs. Northern Boiler & Structural Iron Works*, 139 Northwestern Reporter 729.)

VALIDITY OF CONTRACT WITH LABOR UNION.—A contract between a manufacturer and a labor union to comply with union conditions of employment is not invalid as tending to create a monopoly in favor of union members to the exclusion of other persons seeking employment, if the agreement does not expressly prohibit the manufacturer to employ non-union workmen. (United States Circuit Court of Appeals, Eighth Circuit, *Post vs. Buck's Stove & Range Company*, 200 Federal Reporter 918.)

LIABILITY FOR INJURY TO MINOR EMPLOYEE.—An employer is liable for injury sustained by a minor employee if the latter was engaged without compliance with a State law requiring an employment certificate to be obtained from the public authorities. (United States Circuit Court of Appeals, Third Circuit, *Klicke vs. Allegheny Steel Company*, 200 Federal Reporter 933.)

TENANT'S RIGHT TO REMOVE FIXTURES.—If a lease of premises for manufacturing purposes provides that the tenant, on termination of the contract, shall have the right to remove his trade fixtures, he is entitled to remove engines, boilers, pumps, etc., which are removable without injury to the building, but not sprinkling apparatus or a heating plant which has been affixed to the realty in such manner that its removal would injure the premises. (St. Louis Court of Appeals, *Red Diamond Clothing Company vs. Steidemann*, 152 Southwestern Reporter 609.)

EMPLOYER'S DUTY TO NEW EMPLOYEES.—In engaging a new employee, an employer owes him no duty to provide any new safety devices, the extent of the duty being merely to keep existing machinery in reasonably good repair. (Massachusetts Supreme Judicial Court, *Rivers vs. Richards*, 100 Northeastern Reporter 745.)

PROTECTION OF TRADEMARKS AND TRADE NAMES.—No one is entitled to be protected in the use of a personal name as a trademark. Right to relief on the ground of unfair competition in the use of similar names or marks is tested by the question whether the dealer or manufacturer complained against is attempting to pass off his product as that of the complaining party, and not by the question

whether the public is apt to be deceived. (United States Circuit Court of Appeals, Seventh Circuit, *Borden Ice Cream Company vs. Borden's Condensed Milk Company*, 201 Federal Reporter 510.)

DUTY TO WARN WORKMAN AGAINST DANGER.—An employer is liable for injury to a workman caused by automatic starting of a machine at which he was at work, if the latter did not know and was not warned of a tendency of the machine to start, on account of a latent defect. (Massachusetts Supreme Judicial Court, *Davis vs. Walworth Mfg. Company*, 100 Northeastern Reporter 620.)

DAMAGES AGAINST BUYER NOT WAIVED.—If a contract buyer refuses to receive goods contracted for, and an agent of the seller, having been directed by the letter to sell them elsewhere at the best price obtainable, sells them to the same buyer, the seller does not thereby lose the right to enforce a claim against the buyer for breach of the original contract. (Kentucky Court of Appeals, *New Blue Grass Canning Company vs. Dougan & Hollis*, 152 Southwestern Reporter 566.)

MISTAKE IN QUOTING FREIGHT RATE.—A railroad company is not liable to a shipper for loss resulting through the company's agent's mistake in quoting a rate on an interstate shipment lower than that fixed by a published tariff on file with the Interstate Commerce Commission, though the tariff was not posted or on file in the company's local station. (United States Supreme Court, *Illinois Central Railroad Company vs. Henderson Elevator Company*, 33 Supreme Court Reporter 176.)

WHEN CONTRACT IS COMPLETE.—Where an offer is made by letter or telegram, and is accepted by the same means of communication, the resulting contract becomes complete when the acceptance has been mailed or sent, and not when it is actually received by the offerer. (New York Court of Appeals, *Wester vs. Casein Company of America*, 100 Northeastern Reporter 488.)

DAMAGES FOR DELAY IN DELIVERING MACHINERY.—A seller of machinery is liable to the buyer for loss caused by delay in delivery beyond the time fixed by the contract of sale, if such loss was within the contemplation of the parties when the contract was made, and the buyer does not waive such liability by merely accepting delivery when it is tendered. (Kentucky Court of Appeals, *Carson-Muse Lumber Company vs. Fairbanks, Morse & Co.*, 152 Southwestern Reporter 256.)

VALIDITY OF EXCLUSIVE CONTRACTS FOR SALES.—Contracts with retailers made by an association of manufacturers controlling more than one-half of certain products in the country, whereby the former are to be paid rebates on purchases made from members of the association during the year, at established prices, on condition that no purchases be made from manufacturers not belonging to the association, are not invalid as restricting competition nor as violating the Sherman anti-trust act. (St. Louis Court of Appeals, *First National Bank of Jeannette vs. Missouri Glass Company*, 152 Southwestern Reporter 378.)

FORMATION OF CONTRACTS OF SALE.—Defendant wired an offer to sell about 1000 tons of railroad supplies at \$20 per ton. The offer was accepted, subject to inspection. By reply telegram, defendant accepted that condition, but stated that it was "mailing contract 500 tons shipment 30 days, and 500 tons shipment 60 days." Held, that there was no completed contract to sell, since the buyer's telegram introduced a new condition as to inspection, and the seller's second telegram added the new terms as to time of shipment and the reduction of the agreement to writing. (St. Louis Court of Appeals, *Houston & Brazos Valley Railway Company vs. Joseph Joseph & Brothers Company*, 152 Southwestern Reporter 394.)

VALIDITY OF CONTRACTS OF SALE.—When there are negotiations respecting a sale, they must be such as will bind both parties, or neither will be bound. It follows that, if a seller agrees to deliver such quantities of a commodity as the buyer may choose to order, but the latter does not agree to order any quantity, the contract is void as lacking mutuality. But, if the buyer has an established business, a contract whereby the seller agrees to furnish him with such supplies as he may need during a fixed time is not invalid; both parties being bound, the seller to furnish and the buyer to receive what is needed. (United States Circuit Court of Appeals, Fifth Circuit, *T. B. Walker Mfg. Company vs. Swift & Co.*, 220 Federal Reporter 529.)

WHEN NEGLIGENCE OF CARRIER IS PRESUMED.—Proof that freight was loaded in good condition, that its character was such that if properly handled it would have gone without damage to its destination, and that it arrived in damaged condition, is presumptive evidence of negligence of the carrying railroad. (Minnesota Supreme Court, *Ammon vs. Illinois Central*, 139 Northwestern Reporter 819.)

The Machinery Markets

Varying reports come from machinery distributing centers. Slight improvement in trade is reported here and there although new business is everywhere rather light and big propositions lacking except for requirements which a few railroads have made known. The New York market tends toward quiet with prospective railroad business contributing most of the outlook for greater activity. In Philadelphia the Pennsylvania Railroad is reported as having closed against a small part of the list it has out and a feature is the exportation of transmission machinery, but current business is rather slow. Cleveland has felt a slight improvement, most of which came from single tool orders. Cincinnati reports a general falling off, both in domestic and foreign demand, but the latter is to be expected at this time of the year. Both sales and inquiry have shown some improvement in Detroit with power equipment in especial demand. Chicago has had an improved demand for small lots and railroad and other buying of good proportions remain to be consummated. Milwaukee has had a steady influx of small orders and is still troubled by a shortage of labor. The week has been the best of the month in the Central South. Coal and ore mining developments continue to call for machinery and supplies in Birmingham. Sales continue to be mostly of the single tool variety in St. Louis where the volume of business is reported to be reasonable. In Texas crop conditions are better with a consequently favorable effect on the outlook and the demand for cotton handling equipment is increasing. Demand is somewhat more general on the Pacific coast where some good orders are coming out for mining equipment for Idaho and Washington, although otherwise purchasers are buying in small lots.

New York

NEW YORK, April 30, 1913.

Local trade in machinery lines can be described at best as only fair and on this designation of the extent of activity opinions are not unanimous. A few dealers say their aggregate of miscellaneous sales has been rather good, but more say trade is quiet or dull. At the same time there are many prospects including the requirements of the Pennsylvania and one other railroad entering New York, the Norfolk & Western and the Western Maryland. Some improvement has resulted from the better shipments from the Middle West which are now obtainable. The sale at auction of the plant and equipment of the Chandler Planer Company, Ayer, Mass., April 24, referred to also in the New England market, was attended by New York dealers who made fewer purchases than they anticipated. The smaller machine tools, they report, brought fair prices and more than dealers could profitably pay, while large machines went at ridiculously low figures. They inferred from the latter that the users of large tools are not adding to their heavy equipment at this time. In several instances large tools were bought in by their makers who saw their product being sacrificed. A 20-ton crane with first cost announced as \$4000, brought \$835. A planer, 48 x 48 in. x 36 ft., which cost \$6500 was bought in at \$975. Another large planer which cost over \$4000 brought \$350. A large cylindrical grinder which cost \$3000 brought \$1500 and large gear cutters went very cheap. A rack cutter which cost \$2300 sold for \$200.

Bids on old material at the Washington Navy Yard will be opened by the Navy Department at 11 a.m., May 9. The following items will be disposed of: machine tools, 150 tons scrap steel, 100 tons old pipe, 500 tons foundry ashes and crucibles, 800 tons steel borings and turnings, ingot brass, monel metal, brass and bronze turnings. Schedules containing the form of proposals and terms of sale can be obtained from the General Storekeeper, Navy Yard, Washington, D. C. At a similar sale at the Navy Yard, Philadelphia, bids will be opened at 10 a.m., May 21. The material to be disposed of includes: machine tools, hand tools, motors, boilers, scrap iron, scrap copper. The General Storekeeper, Navy Yard, Philadelphia, Pa., should be addressed for information.

The Turner Construction Company, 11 Broadway, New York, has been awarded the general contract for the construction of a cold storage warehouse 50 x 100 ft., eight stories and basement, for the Merchants' Refrigerating Company. It will be constructed entirely of reinforced concrete and located at River street, Newark, N. J.

The W. H. Spunswick Mfg. Company, Fulton, N. Y., has plans in progress for a knitting mill 40 x 102 ft., two stories, which it will build this summer.

The Mullen & Buckley Mfg. Company, Inwood, N. Y., has been incorporated with a capital stock of \$60,000 to manufacture window screens, doors, etc., and will build a plant. G. H. Mullen, W. J. Buckley and J. H. Post, Far Rockaway, are the incorporators.

The Moline Plow Company has completed plans for a factory building 80 x 320 ft., four stories, which it will build at Poughkeepsie, N. Y.

The Kapailo Mfg. Company, Inc., Tuckahoe, N. Y.,

has filed incorporation papers with a capital stock of \$150,000 to manufacture various patented articles. C. Chisholm, C. L. Strong and J. W. Parsons, New York City, are the incorporators.

Contract for installation of an electric lighting system, generators, etc., in the Samaritan Hospital, Troy, N. Y., has been awarded to Barnes & Taylor, contractors, of that city.

The Towanda Mfg. Company, Towanda, N. Y., and the Allenville Hosiery Mills of McVeytown, Pa., have been merged and incorporated under the name of the Allenville Hosiery Mills, Inc. The entire equipment of the Allenville Mills plant will be removed from McVeytown to the merger company's knitting mill building at Towanda, where it will be installed together with considerable new equipment. Vance A. Zerly is president of the consolidated company.

The D. S. Watson Company, Canastota, N. Y., maker of fire shields, etc., has plans in preparation for a manufacturing plant which it will build this summer. The initial building will be 50 x 100 ft., two stories, with boiler house 34 x 64 ft. Supplementary buildings will be erected later.

The Central Foundry Company, Syracuse, N. Y., recently incorporated to make brass, bronze, aluminum and white metal castings, will specialize in the manufacture of vacuum cleaner tools.

Work has been commenced on the first building of the plant of the newly organized Jamestown Upholstery Company to be built on Crescent street.

The Curtis Machine Corporation, Jamestown, N. Y., has been incorporated with a capital stock of \$100,000 to manufacture machinery parts, etc., and will build and equip a plant. D. A., Fred M. and Frank G. Curtis, 504 Fenton Building, Jamestown, are the directors.

The General Electric Company, Schenectady, N. Y., will build a machine shop extension 54 x 166 ft., two stories, at its plant. The estimated cost of the building is \$40,000.

The American Bridge Company's plant, Elmira, N. Y., has received contract from the Vance Boiler Works, Elmira, N. Y., for construction of a manufacturing building 75 x 160 ft., one story.

The Hewitt Rubber Company, Buffalo, N. Y., has awarded the Turner Construction Company, New York, the general contract for the construction of an all reinforced concrete factory building 90 x 460 ft., three stories, with an L. 30 x 61 ft. Plans are by Lockwood, Greene & Co.

The Strong Steel Casting Company, Buffalo, N. Y., is in the market for a locomotive crane and magnet for handling scrap and pig iron in its stock yards.

The Selleck Company, Buffalo, has filed articles of incorporation with a capital stock of \$40,000 to manufacture and deal in automobile accessories, shock absorbers, etc. The company is located at Main and Goodrich streets. W. M. Selleck, Rochester; G. K. Selleck, Buffalo, and M. L. Selleck, Providence, R. I., are the incorporators.

F. L. Houghes & Co., Inc., 190 South avenue, Rochester, has purchased a 3 1/2-acre site on Lydell avenue adjoining the plant of the American Wood Working Machinery Company upon which it will build a new iron works. A structural steel plant 100 x 160 ft., one story, will first be erected at an estimated cost of \$75,000, to which will be added later a foundry and machine shop.

New England

Boston, Mass., April 29, 1913.

The consensus of opinion regarding the future of business, as gathered from men in the metal market lines, is not easy of concrete expression. A great deal of speculation is heard concerning the outlook, ranging from cheerful confidence to dark foreboding. The former expression is more common than the latter. Most manufacturers are as busy as they have been, but some of them appear to be anxious as to the effect of the tariff on their customers. The schedules as announced contain certain anomalies, and these are being cited broadcast. The textile machinery builders have withdrawn from the market as buyers, preferring to wait upon the effect of the tariff on their customers, many of whom feel they will be hard hit. Of the doubtful ones among the manufacturers and dealers it is impossible to differentiate between those who are talking for effect and those who are convinced of the facts that they express. It is pretty safe to assert that after the tariff bill becomes a law the business atmosphere will take on a rosier hue for a great many observers. As it is the feeling of unrest is greater than it was a few weeks ago.

The sale of the business of the Fore River Shipbuilding Company, Quincy, Mass., to the Bethlehem Steel Company interests has created much speculation in New England as to the future of this important industry. The belief of those best equipped to express an opinion is that the Fore River plant should not only retain but increase its present importance. The location is wholly desirable, and the labor supply is such as to be an important factor.

The auction sale of the property of the Chandler Planer Company, Ayer, Mass., April 15, proved something of a surprise, for the reason that the patents, fixtures and patterns for the quick return mechanism sold for a mere song, a few hundred dollars, to Doherty Bros., Lowell, Mass. The real estate brought a low figure, as was expected. Of the machine tools the smaller brought good prices and the heavier low prices. The average was about 60 per cent. of the latest lists of the manufacturers.

Martin D. Farnum, who has had charge of the western Massachusetts and Connecticut territory for the Chandler & Farquhar Company, Boston, for a number of years, has acquired an interest in the Bacon & Donnavon Engine Company, Springfield, Mass., dealer in engines, waterworks equipment, lighting plants, etc. He becomes associated with Clarence N. Bacon, who recently purchased the stock owned by William J. Donnavon. Mr. Farnum is well known in the machine tool trade of New England, where he has made many friends.

The Chandler & Farquhar Company has given the western Massachusetts and Connecticut territory to John S. Alcorn, who has been in charge of sales for the Boston district.

The National Company, Waterbury, Conn., has been organized with M. J. Byrne president and treasurer; A. A. Tanner vice-president, and F. C. Smith secretary. The company has acquired 10 acres of land in Waterbury, on the Watertown branch of the New York, New Haven & Hartford Railroad, and is having plans prepared for a substantial factory building, work upon which will commence immediately for the manufacture of brass goods. The company is not yet prepared to make further statement concerning its product.

The Underwood Typewriter Company, Hartford, Conn., states that there is no truth whatever in the dispatch from Wheeling, W. Va., that it proposes to establish its casting department in that city.

The Saco-Lowell Shops, Lowell, Mass., have not yet decided whether to go ahead with enlargements which have been noted. The plans call for a foundry 50 x 220 ft., one story, and a cupola building 47 x 73 ft.

The business of the Manville Bros. Company, Waterbury, Conn., manufacturer of special metal working machinery, has been closed out and the corporation name has practically gone out of existence.

The John Swaine Iron Works, Springfield, Mass., which is about to erect a new plant on Cypress court, states that it intends to replace all the present equipment with new machinery and will probably extend the list beyond the replacements. The new building will be 50 x 60 ft., four stories. The company manufactures ornamental iron work, fire escapes and similar kinds of iron and steel work.

The addition to the works of the Clark Bros. Bolt Company, Milldale, Conn., will be used for manufacturing purposes as well as for additional room for storage and shipping purposes. The company reports business as extremely active, making the improvements neces-

sary, if the trade is to be taken care of. The structure will be 50 x 80 ft., one story.

The Bridgeport Mechanical Company, Inc., Bridgeport, Conn., has been incorporated under a Connecticut charter, with a capital stock of \$50,000. The business of the company is to promote American inventions, to do engineering work, including efficiency engineering and systematizing, and to act as district representative of mechanical products. All manufacturing will be done by subsidiary concerns.

The William A. Hardy & Sons Company, Fitchburg, Mass., manufacturer of composition castings and various specialties, notably screen plates and suction plates, is making large improvements to its plant, consisting of the remodeling of existing buildings, and the erection of an addition 50 x 90 ft., two stories, which includes office space.

The new foundry of the John T. Young Boiler Company, Norwich, Conn., manufacturer of steam and water heating boilers, is practically finished and will soon be ready for occupancy. Most of the new equipment has been purchased. The building will be 66 x 136 ft., and 18 ft. to the bottom of the plates.

The Stanley Works, New Britain, Conn., manufacturer of builders' hardware, has bought about 10 acres of land at Niles, Ohio, adjoining its present plant, on which to build additions when conditions make it desirable to do so. No definite plans for such improvements have been made.

The new building of the E. J. Manville Machine Company, Waterbury, Conn., will be used for the building of the larger sizes of cold heading machines and the larger sizes of other machinery included in the company's product. The structure is of brick, 50 x 200 ft., and will be served by a 20-ton Shaw crane. It will be equipped with heavy motor-driven machines, which have been ordered. Electric power will be furnished from the company's power plant.

The Springfield Elevator Company, Springfield, Mass., has not decided on the full details of its new plant, which will soon be erected in East Springfield on the Athol Branch of the Boston & Albany Railroad. The structure will be 100 x 260 ft., one story, of brick construction. The requirements in the way of machinery are not settled.

The C. J. Root Company, Bristol, Conn., manufacturer of automatic counters, wrought brass hinges, metal stampings, etc., has not yet settled what new machinery will be installed in the large addition now under process of construction, excepting that its wants will not be numerous. The building will be 40 x 120 ft., three stories. The first floor will be used for plating, buffing, polishing, tumbling and lacquer rooms, and the second and third floors for manufacturing.

Philadelphia

PHILADELPHIA, Pa., April 29, 1913.

Some small orders in which little competition was involved have been placed against the recent list of the Pennsylvania Railroad, but the general business is still unclosed. The greater part of the current buying and inquiry has been in single tool lots. Some prospective purchasers of machinery and tools are hesitating, awaiting more definite developments in tariff matters and the influence of lower duties. The export demand for machine tools is quiet, but a fair business is being done in power transmission specialties. Special tool builders are fairly busy, particularly the smaller plants, but makers of standard lines of machine tools could easily take care of an increased volume of business. Second-hand machinery and general tool equipment has been quiet. Power equipment has been in fair demand. Foundries, both gray iron and steel casting, continue well engaged.

The Lord Baltimore Motor Car Company, Harford Road and Baltimore & Ohio Railroad, Baltimore, Md., will erect its manufacturing plant in Frederick. Plans for the buildings are under way. John Lutz, Jr., is president and J. Elmer Stryker secretary of the company.

The American Manganese Bronze Company, Holmesburg, has let a contract for an addition, 30 x 45 ft., to its power plant. A new gas engine and Crocker-Wheeler generator has been purchased. A new 50-ton electric traveling crane has been erected in the foundry.

The Pennsylvania Railroad is taking estimates for a boiler plant and machine shop, 62 x 100 ft., brick and steel, one story, to be erected at West Morrisville, Pa., from plans by its own engineers.

Local contractors are figuring on contracts for the erection of a factory for the Milton Brick Company.

Milton, Pa. Plans provide for two buildings, 60 x 140 ft. and 35 x 66 ft.

Cramp & Co. will erect a ten-story apartment house, 40 x 130 ft., at Spruce and Watts streets for Mrs. Thomas W. Barlow. A power plant, elevators, steam heating and power cleaning plant will be installed.

Plans have been prepared for a six-story manufacturing building to be erected for F. L. Shissler and William West at Eighth and Spruce streets. It is reported that the new building will be used for the manufacture of gas and electric fixtures, but details are unavailable.

Chicago

CHICAGO, ILL., April 29, 1913.

There remain to be closed in this market several lots of machine tools for railroad use including those for which the Santa Fé is taking prices, a small list for the Rock Island & Pacific and a few remaining tools to complete the Wabash purchases. Regarding the Santa Fé business indications point to a very general distribution of the orders at exceptionally close prices. The Western Electric Company is understood to be contemplating the purchase of equipment for which an expenditure in the neighborhood of \$100,000 will be made. Sales of a 60 x 60-in. x 14-ft. planer and a large boring mill to the Litchfield Foundry & Machine Company, Litchfield, Ill., are typical of the improved volume of business in small lot sales of machines for industrial installation. There is a very active demand for power apparatus and for electrical equipment for general service.

The Chicago Steel Foundry Company, Kedzie avenue and Thirty-seventh street, which is now experiencing the largest business since the founding of the company, is arranging to put its second converter into operation and is just completing its new cleaning, storage and shipping building. New air compressor and sand blast capacity have been installed.

Reid, Murdoch & Co., Chicago, have taken out a building permit providing for the erection of a warehouse 181 x 242 ft., seven stories, to cost \$800,000.

The Link Belt Company, Chicago, will build for the O. S. Richardson Coal Company a coal-handling storage plant to occupy a ground space 192 x 510 ft. The installation will cost \$150,000.

The International Harvester Company has taken out a building permit to cover the erection of a one-story forge shop 70 x 280 ft. at Calumet to cost \$60,000.

The H. Koppers Company, Chicago, has taken out a license to operate in St. Louis with a capital stock of \$50,000 for a period of 50 years. This is to provide for the building of the new coke ovens for the Laclede Gas & Coke Company.

The American Rotary Valve Company, Chicago, 156 North Dearborn street, builder of compressors has filed notice of an increase in its capital stock from \$750,000 to \$1,000,000 and of the number of its directors from three to five.

The Acme Brass & Aluminum Foundry, Chicago, has been incorporated with a capital stock of \$10,000 to engage in the manufacture of metal articles. The incorporators are Edward M. McGee, Otto M. Hoffman and E. G. McArthur.

The Lasker Iron Works, Chicago, has let the contract for a new boiler shop at Thirty-second street and Lincoln avenue. The building is to be of steel construction 100 x 100 ft. New punches and a bevel shear will be purchased. The company has been operating in leased quarters at 2830 South Ashland avenue.

At Aurora, Ill., a bond issue of \$30,000 has been authorized to provide for the extension of the water works system and the construction of auxiliary water works.

The Peerless Drill Company, Rockford, Ill., has been organized with a capital stock of \$5,000 by William B. Johnson, Carl V. Hyman and N. P. Nelson to manufacture a new line of tapping machines, drills and similar tools designed.

The Clipper Belt Lacer Company, Grand Rapids, Mich., manufacturer of belt lacing machines, has in preparation plans for the erection of an addition to its plant to provide more room for its machine shops, wire forming and hook carding apparatus.

The Crex Carpet Company, with principal offices at 377 Broadway, New York, has acquired a site at Minneapolis on which it will build a large plant the cost of which is estimated in the neighborhood of \$1,000,000. Included among the several buildings to be erected are a machine shop 100 x 100 ft. and a power plant 50 x 125 ft.

The Nevada Mfg. Company, Nevada, Iowa, builder of motor trucks, is building an addition, 50 x 150 ft., to its present factory. The new building will be used for wood working and body building.

The Armstrong Mfg. Company, Waterloo, Iowa, is erecting a large addition to its plant in that city to be used as an assembly and erection shop. An electrically operated overhead crane is to be installed.

The plant of the Dubuque Boat & Boiler Works, Dubuque, Iowa, was considerably damaged by fire April 20 with a loss approximating \$25,000. The power plant and machinery replacement is being undertaken and parts of the plant are operating by means of temporary repairs.

Cleveland

CLEVELAND, OHIO, April 29, 1913.

Business with the local machinery houses has improved slightly, but it is still quiet. With few exceptions orders placed in the week were for single tools. The National Quality Lamp Division of the General Electric Company has placed orders for several machines for a new plant in Cleveland and the Marion Steam Shovel Company, Marion, Ohio, has purchased some machinery, but the bulk of its requirements contained in its list sent out some time ago has not yet been bought. Some business that was in prospect a few weeks ago was held up by the Ohio floods. A limited amount of business is beginning to come out of the flood-stricken cities. The proposed tariff changes has had the effect of holding back some other pending business. Manufacturing plants are generally well filled with work, but they are following a very conservative policy in placing orders for additional equipment for plant extensions.

The Cleveland Electro Metals Company, Cleveland, is the name of a new concern that will engage in smelting and refining non-ferrous metals and alloys. The company will be located in the building formerly occupied by the People's Gas Light Company, West Twenty-fifth street and Mulberry avenue. The technical side of its research work will be under the direction of the Cleveland Research & Test Laboratories. The incorporators of the company who will be largely interested in its affairs are H. G. Wellman, John W. Brown, F. S. Wellman, W. G. Wilcox and C. W. Hill.

The Davies-Beach Mfg. Company, Cleveland, with a plant at Alliance, Ohio, for the manufacture of automobile parts, has increased its capital stock from \$300,000 to \$600,000. The company is about to place a contract for a large addition to its plant to be used for assembling purposes and a pickling department. Further extension will be made in the summer when the company plans the erection of a sheet metal and enameling plant.

Extensions are being made to the plant of the Kenton Hardware Mfg. Company, Kenton, Ohio.

The Standard Steel Castings Company placed its new plant at 311 West Seventy-third street, Cleveland, in operation April 26. The plant is equipped with a two-ton converter. The company will specialize on small castings.

The Suspension Roller Bearing Company, Sandusky, Ohio, has increased its capital stock from \$250,000 to \$350,000.

The Hoffman Heater Company, Lorain, Ohio, has increased its capital stock from \$25,000 to \$75,000 and will enlarge its plant by the erection of a one-story addition, 42 x 125 ft.

The Skyes Metal Lath & Roofing Company, Niles, Ohio, has started the erection of a new plant on a site recently purchased on Walnut street, in that city. The company will build two fireproof buildings of brick and steel, one 80 x 300 ft. and the other 20 x 60 ft.

The Lake Shore Railroad will shortly place an order for new coal docks at Elyria, Ohio, to replace the plant recently burned. Handling equipment will be required.

The village of Loudonville, Ohio, is in the market for a prime mover, boilers, generator, switchboard and a centrifugal pump for its electric light and water works plant. Sealed proposals will be received by the Board of Trustees of Public Affairs of the village, May 7.

The Summit Foundry Company, Akron, Ohio, will erect a new foundry, 50 x 100 ft. It will be of brick and steel construction.

The Atlas Car & Mfg. Company, Cleveland, has commenced to move to its new plant on Ivanhoe road. It expects to be completely located in its new quarters in the coming month.

C. Hofer & Co. are installing a new machine shop on East Butler street, Loudonville, Ohio.

The Union Chain & Mfg. Company, Seville, Ohio,

recently incorporated with a capital stock of \$10,000 by Walter Hay, J. A. Lowrie and others, will place on the market a new steel sprocket chain designed for various kinds of power transmission, elevating and conveying purposes. The company will not erect a plant at the present time.

The Alliance Rubber Company, Alliance, Ohio, will shortly begin the erection of a new plant for the manufacture of a line of rubber goods. Until it is completed the company will occupy temporary quarters.

The Novelty Iron Company, Canton, Ohio, has increased its capital stock from \$150,000 to \$250,000.

The Akron Steel Casting Company, Akron, Ohio, has been incorporated with a capital stock of \$10,000 by A. A. Griffo, and others.

A new ice manufacturing plant with a daily capacity of 60 tons will be built by the Sheriff Street Market & Storage Company, Cleveland.

The Imperial Brass Foundry & Mfg. Company, Painesville, Ohio, recently incorporated, will manufacture a line of steam fittings, hot-water and gas supplies and brass, aluminum and bronze castings. The company has acquired the Foyer plant in Painesville, which furnishes 15,000 to 18,000 sq. ft. of floor space and is well equipped for the manufacturing purposes of the new company. The officers of the company are J. I. English, president; John Kennedy, vice-president, and M. T. Williams, secretary and treasurer.

Cincinnati

CINCINNATI, OHIO, April 29, 1913.

A general falling off in business is reported by a number of machine tool builders. It is not believed that this is attributable entirely to the damage wrought by the recent floods. Export orders are scarcer, but the let-up in the export business is natural at this particular season of the year. One particularly annoying feature for all manufacturers in the Central West is the scarcity of common labor. There has been such a heavy demand for labor in the flood districts that the local supply, in many places, has been exhausted. Heavy building operations are also a factor contributing to the present shortage. Second-hand machinery is moving slowly; with the exception of a demand for small pumping outfits, there is little doing. The jobbing foundries are busy on old contracts, but new business is not coming in fast.

The Allen Breed Tractor Company, with offices in the Mercantile Library Building, Cincinnati, will soon incorporate with \$50,000 capital stock to manufacture oil-burning traction engines. The company has purchased the modern factory building on Carthage pike, formerly occupied by the Fireproof Construction Company, which it expects to have in operation August 1. Practically the necessary equipment has been purchased.

The Cullen & Vaughn Construction Company, Hamilton, Ohio, has been awarded contract to erect a plant for the Charles H. Wright Paper Company, Middletown, Ohio. There will be two buildings, 65 x 210 ft., two stories, as well as a power house and cold storage plant.

The Cincinnati Iron & Steel Company, Cincinnati, has increased its capital stock from \$300,000 to \$400,000. No additions to its plant are contemplated.

The Hayden-Corbett Chain Company, Columbus, Ohio, is rushing the reconstruction of its plant, that was damaged by the recent floods. No additional machinery will be required.

The Cambridge Furniture Company, Cambridge, Ohio, has been incorporated with \$50,000 capital stock, and will erect a furniture factory for which some machinery equipment will be required. T. W. Scott and C. C. Cosgrove are named among the incorporators.

The Champion Coated Paper Company, Hamilton, Ohio, is buying equipment for its new factory to take the place of its plant recently destroyed by fire.

The A. S. Boyle Company, Cincinnati, has let contract for a new factory building on Langdon avenue, that will be 50 x 175 ft., two stories, and of brick construction. The company manufactures a floor wax.

The J. E. Scott Cup Company, now located at Marietta, Ohio, has made arrangements to move its plant to Columbus, Ohio, and will increase its output of valve cups and packing for pumps.

The Sheffield Tool Steel Company, Cincinnati, now located at 77 Elm street, has leased larger quarters at 122 West Second street, and will move to the new location May 1.

The municipality of Lancaster, Ohio, is contemplating the construction of a central lighting plant, for which power and other equipment will be required.

The Hamilton Welding Company, Hamilton, Ohio,

is a new firm organized to do oxy-acetylene welding. It expects to be in operation within 10 days.

Peters, Bossert & Koebbe, Cincinnati, is a new company formed to take over the business of Peters & Bossert, located at Pike and Front streets. The company makes a specialty of general machinery repair work, as well as of the manufacture of labor-saving devices, special tools, dies, etc. It is composed of E. Bossert, Charles Koebbe and William Peters.

Wheeling

WHEELING, W. VA., April 29, 1913.

The people of Shadyside, Ohio, have raised a bonus of \$8,000 to aid the Shadyside Enameling Company to rebuild its plant destroyed by fire.

The Rig & Reel Company, Parkersburg, W. Va., has secured a new site for a plant on Marietta avenue, which was chosen with a view to escaping floods.

The Fairmont & Cleveland Coal Company, Fairmont, W. Va., has been incorporated with \$600,000 capital stock. The incorporators are W. N. Engle, T. L. Henderson, R. R. Wallis, Anthony Bowen, J. R. Burns of Fairmont.

The McKelvey-Ewing Electric Company, Wheeling, W. Va., has been chartered with \$5,000 capital stock to engage in the business of electric construction.

The Weimer Packing Company, Wheeling, is erecting a \$25,000 packing plant. Modern machinery will be installed.

The Barnesville Mfg. Company, Barnesville, W. Va., is having an addition of 60 x 90 ft. built, in which weaving and spinning machinery will be installed. The construction of the building is in charge of Walter Eliason.

The Huntington Chamber of Commerce, Huntington, W. Va., has indorsed a bond issue of \$1,000,000, of which \$800,000 is to be used to install a city water plant and \$200,000 for paving and street improvements.

The Fairmont Brick Company, Fairmont, W. Va., has been incorporated with a capital stock of \$50,000 to manufacture brick, tile and sewer pipes. J. T. Hawkins, J. A. Swiger, S. A. Shuttleworth, John M. Kisner, James G. Cunningham of Fairmont are the incorporators.

The Red Brick Company of Williamson, W. Va., has been incorporated with \$15,000 capital stock. The incorporators are Hoge Mason, Bluefield, W. Va.; S. B. Jones, C. H. Whitescarver, Thomas Blackburn and Zobedia Groseclose of Williamson.

The Phillips Lumber & Mfg. Company, Charles Town, W. Va., has been incorporated with \$50,000 capital stock by the following: R. H. Phillips, Bessie W. Phillips, O. K. Phillips, Alma F. Phillips, Gertrude Phillips, Pauline Phillips, of Charles Town.

Detroit

DETROIT, MICH., April 29, 1913.

April business in the Detroit district shows a smaller total than that of March, and the month on the whole was a quiet one in most lines. An improvement in the tone of the market has been in evidence during the past week, the betterment including both inquiries and sales, although the latter have been quite closely confined to the single tool class. Tool builders are pretty well occupied and report a steady run of orders. Second-hand machinery inquiry is coming out quite freely and a normal volume of business is reported by dealers. Power plant equipment, boilers and engines, particularly the latter, are in good demand. The foundry trade continues well engaged and one or two steel castings plants are contemplating an early enlargement of their facilities. Belated reports from the April elections indicate that a considerable number of projects for the construction of bridges have carried, which will cause a demand for structural shapes. Contractors are busy and new construction work is coming out in good volume.

The J. W. Murray Mfg. Company, Detroit, has been incorporated with \$60,000 capital stock to take over and continue the unincorporated business of the same style formerly owned by J. W. Murray. The new company manufactures automobile parts and sheet metal stampings, and will be able to extend its operations as a result of the incorporation. John W. and James R. Murray are the principal stockholders.

The Bowering Soap Company, Detroit, has been incorporated for the purpose of manufacturing soaps and perfumes. The company is having plans prepared for the erection of a three-story frame factory in Ecorse, a Detroit suburb.

The Crawford Laundry Company, Detroit, has awarded the contract for a one-story brick addition to its laundry plant at Jefferson avenue and Hastings street. Some additional equipment will probably be required.

The Universal Metal Products Company, Detroit, has been incorporated with a capital stock of \$50,000 to manufacture automobile accessories. M. Lewis Brown, Samuel R. Williams and Leo M. Butzel are named as incorporators.

The F. J. Jacobs Company, Detroit, operating a metal welding plant, has awarded the contract for the erection of a one-story factory building at Guoin and Chene streets.

The Detroit Trust Company has been named as receiver of the Warren Motor Car Company, manufacturer of automobiles, Detroit. The receiver has been authorized to continue the business of the company.

The General Builders' Supply Company, Detroit, has been incorporated with \$10,000 capital stock to operate a plaster mill. W. F. McGraw and Louis Kernter are the principal stockholders.

The Detroit Washing Machine Company, Detroit, has been incorporated with \$4,000 capital stock by W. C. Murdock, E. S. Bryant and J. L. Kelly. The new company will engage in the manufacture of washing machines.

The C. K. Williams Company, Easton, Pa., has concluded negotiations with the Commercial Club of Kalamazoo, Mich., whereby the company will locate a plant in that city. The building will be of fireproof construction and will cost \$30,000. The company manufactures paper mill supplies.

The MacKinnon Boiler & Machine Company, Bay City, Mich., has acquired an additional factory site and placed contracts for the erection of new buildings which will, it is stated, cost \$100,000. The company operates boiler and machine shops and a foundry. Hector MacDonald is president and general manager.

The Board of Commerce, Flint, Mich., has secured a new industry for that city which will be known as the Flint Sheet Metal Works. The new concern has a capital stock of \$10,000, and will manufacture sheet metal specialties.

The city of Kalamazoo, Mich., has made an appropriation for a new municipal lighting plant and plans are now being prepared therefor. The matter is in the hands of the city lighting commission.

The Breckenridge Farmers' Elevator Company, Breckenridge, Mich., has been organized with \$17,000 capital stock to build and operate an elevator. B. L. Case and J. S. Doyle are among those interested.

The Wells-Higman Company, Traverse City, Mich., manufacturer of baskets, will build a two-story brick addition to its factory.

The Great Western Mat Company, Muskegon, Mich., recently organized, has purchased the mat business and mat-making machinery of the Brunswick-Balke-Collender Company and has acquired a new factory. Additional machinery will be installed.

The rapid growth of the business of the Rodgers Iron Mfg. Company, Muskegon, Mich., has made expansion of its facilities imperative and the company is preparing to erect an addition to its plant.

The Frugale Power Company, Whitehall, Mich., has been incorporated with \$20,000 capital stock to conduct a power and light business. The company plans the construction of a power plant on the White River near Whitehall.

Indianapolis

INDIANAPOLIS, IND., April 29, 1913.

The H. J. Martin Forging Company, Indianapolis, is installing three additional Erie steam hammers in its forging department. This company, while in the flood district, suffered no damage beyond the flooding of the oil tanks in the forge department and operations were uninterrupted.

The Cole Motor Car Company, Indianapolis, is planning to begin construction work on another addition to its plant. It will be a four-story building and will cost \$150,000.

Remy Brothers, Anderson, Ind., who recently sold their interest in the Remy Electric Company, manufacturer of magnetos, will build and equip a shop in that city at a cost of \$75,000 to manufacture devices developed by them.

The Rochester Bridge Company, Rochester, Ind., has received a contract for a large excavating machine to be shipped to the island of Java. Another contract is for a forge building for the International Harvester

Company at Plano, Ill., requiring 350 tons of structural material.

The Wabash Valley Utilities Company, Ft. Wayne, Ind., has been incorporated with \$10,000 capital stock to do a general public utilities business. The directors are H. E. Vordermark, Frederick H. Schmidt, O. H. Lindenberg, Leland Wilkens and W. H. Snyder.

The Pere Marquette Railroad Company has made a proposition to move its shops connected with the western terminal from Chicago to Chesterton, Ind. A committee of citizens is in conference with the railroad officials. H. F. Carlson is chairman of the committee.

The Wabash Water & Light Company, Wabash, Ind., has increased its capital stock from \$160,000 to \$500,000.

The American Highway Supply Company, Terre Haute, Ind., has been incorporated with \$10,000 capital stock, to deal in road machinery. The directors are W. A. Braden, Thomas Concannon, A. D. Huff, J. A. Shepherd and C. E. Zimmerly.

The Anderson Wire Fence Company, Anderson, Ind., has purchased a 10-acre site for factory buildings at Evansville, Ind., to which the company will move.

The Evansville Carriage Woodstock Company, Evansville, Ind., will build a new plant.

The Tri-City Electric Company, Hammond, Ind., has been incorporated with \$10,000 capital stock to do general electrical work. The directors are F. D. Jarvis, L. J. Granger and A. H. Lietz.

The Iserman Veneer Door Company, Richmond, Ind., has been incorporated with \$25,000 capital stock to manufacture doors. The directors are H. F. E. F. and E. H. Iserman.

At a special election, York, Ind., voted to incorporate, so as to provide a water works and electric light system.

The Chambers Fireless Cooker Company, Shelbyville, Ind., will build a foundry, 44 x 96 ft., on a site near the Pennsylvania Railroad.

The Richmond City Waterworks, Richmond, Ind., has increased its capital stock \$4,000.

The Modern Specialties Mfg. Company, Goshen, Ind., has increased its capital stock from \$50,000 to \$100,000.

The Roann Water & Light Company, Roann, Ind., has been incorporated with \$15,000 capital stock, to operate a water and lighting company. The directors are B. E. Goltry, C. M. Comer and J. M. Wagoner.

The Indiana Wood Products Company, Spencer, Ind., has been incorporated with \$20,000 capital stock to manufacture wooden articles. The directors are George W. White, H. B. White and L. D. Ault.

Milwaukee

MILWAUKEE, WIS., April 28, 1913.

The general situation in the machine tool industry in this district shows some improvement, which, although slight, is a continuance of the steadily improving tone and gives excellent promise. More men are being added to pay-rolls as rapidly as they are obtainable, and while the limit of capacity has apparently been reached in a few of the busiest shops, the limits are sufficiently elastic to avoid the immediate necessity of extensions. The influx of small lot and individual tool orders continues, and some shops report that they do not seem to be able to make any headway in cutting down the period of time between bookings and deliveries. Purchasers have commenced crowding the builders for more rapid execution of orders.

A feature in the news of the week is the passing of the controlling interest in the Milwaukee Machine Tool Company, manufacturing lathes and other machine tools, to E. J. Kearney and Theodore Trecker, the owners of the Kearney & Trecker Company, builder of Milwaukee milling machines. George A. Douglass, principal stockholder in the Milwaukee Machine Tool Company, and president, retires to devote his entire attention to other interests. Clarence Dillon, owner of the remaining shares, retains his interest, and is continued as vice-president on the reorganized official staff, of which Mr. Kearney becomes president and general manager, and Mr. Trecker secretary and treasurer. The Machine Tool works are situated on Mitchell street, between Fifty-eighth and Sixtieth avenues, West Allis, and the Kearney & Trecker works are on National avenue, between Fifty-ninth and Sixtieth avenues, two blocks separating the two shops. No change in the works or in the policy is contemplated at this time, and the companies will continue to operate as separate corporations. Both are widely known in their

respective fields and the new order of things is regarded in a most favorable light throughout the trade.

The Barnes Construction Company, Oshkosh, with a capital stock of \$60,000, has been organized to engage in the manufacture, construction, sale, installation and equipping of automatic sprinklers and all kinds of fire extinguishing and fire prevention apparatus and devices. The promoters include Harold L. Barnes, W. G. Maxcy and Charles P. Bray.

The Sebring-Phelps Company, Wilmette, Ill., manufacturing electric cooking stoves and appliances, may move to Baraboo, Wis., if the Baraboo Commercial Club comes forward with sufficient inducements. The company is occupying temporary quarters at Wilmette and is ready to begin the manufacture of its devices for the market.

The Beloit Foundry Company, Beloit, has started construction work on a 40 x 40-ft. addition made necessary by the heavy demands upon its present facilities. John E. Gosline is president and Paul Holverson is secretary and treasurer.

The Optenberg Iron Works of Sheboygan is so overcrowded with work that the construction of an addition is under consideration. The only obstacle in the way of the work is lack of sidetrack facilities, which, if procured, will determine immediate building operations. It is the intention to execute much heavier work than can now be undertaken.

A welding and general machine shop is being established at Sheboygan by the American Gas Engineering Company, recently incorporated with a capital stock of \$50,000 by E. M. Parmelee, L. L. Rowlands and B. Lucas. It is the intention later to engage in the manufacture of gasoline engines.

A central heating and power plant for the high school and a nearby ward school will be constructed at Antigo, in case the Common Council regards the request of the Board of Education favorably. The cost is estimated at \$13,800. W. T. Liebert, Antigo, is consulting engineer.

In asking the Common Council of Manitowoc to enlarge and extend the municipal water works mains to provide a larger water supply and better fire protection, William Rahr, president of the Manitowoc Malt- ing Company, gave notice that the company intends to make improvements and extensions to its plant after July 1. The estimated cost is in excess of \$100,000.

The Racine Drop Forge Company, Racine, recently organized, has leased part of the former Racine-Sattley works and is installing equipment for die sinking, drop forging, heat treating, punching and hand forging. Some little equipment will be purchased, although the principal requirements are already filled.

The Royal Ice Machine Company, Grand Rapids, Wis., has been incorporated with a capital stock of \$25,000 to manufacture ice-making and refrigerating machinery designed by George Krieger. Mr. Krieger and Joseph Rick are the moving spirits in the enterprise, and are now engaged in the construction of models in various sizes and capacities.

William Frayer, Corliss, is preparing to rebuild his machine shop and garage destroyed by fire recently. The loss was \$7,500.

Articles of incorporation have been filed by the Prefex Radiator Company, Racine, which will supplant the Illinois corporation of the same name which several months ago moved its shops and offices to Racine from Chicago. The new company has a capital stock of \$15,000. A. B. Modine is president; J. D. Rowland, vice-president, and F. M. Opitz, secretary and treasurer. The company manufactures automobile radiators, water pumps, and other motor car appliances.

The Globe Pump Company, Green Bay, Wis., has been organized with a capital stock of \$30,000 by James Gleason, James MacGillen and John J. Ganerke to engage in the manufacture of pumps and fittings.

The Chicago, St. Paul, Minneapolis & Omaha Railway, one of the Northwestern Lines, has begun the erection of a 32-stall roundhouse machine shops and other improvements at Altoona, Wis.

The Bullis Automatic Machine Company, Milwaukee, has been organized with a capital stock of \$25,000 by George C. Holtz, F. O. Bullis and E. D. Fitzpatrick.

The Milwaukee-Western Fuel Company, Milwaukee, has in contemplation dock improvements which will involve an expenditure of \$400,000. Electrically operated cranes and coal handling machinery will be installed. The Philadelphia & Reading Coal & Iron Company is considering similar improvements.

Paul Klumb, secretary of the Globe Foundry & Machine Company, Sheboygan, Wis., with his two sons, will build a factory in that city to include foundry and machine shop for the manufacture of gasoline engines.

The Central South

LOUISVILLE, KY., April 29, 1913.

While the past week has been the best of the month, it failed to come up to the expectations of members of the machinery trade, who are rather disappointed with the results of the month's work. The flood, of course, has had a great deal to do with the situation, as business was greatly handicapped in the early part of the month on this account, while the beginning of the special session at Washington is, in spite of sentiment to the contrary, causing manufacturers to hold back a bit in their plans for enlargements and expansions. There are still plenty of prospects for business, according to dealers and makers of equipment, and it is hoped that these will materialize into orders in the near future. Meanwhile trade seems to be continuing on a rather narrower basis than in the first quarter of the year.

The importance of Louisville as an iron trade center is illustrated in a list of manufacturing industries, with the number of men employed, prepared by the Louisville Lighting Company, a local central station. The following concerns employ 100 or more: American Machine Company, elevators; B. F. Avery & Sons, plows; Bridgeford & Co., stoves; Brinly-Hardy Company, plows; W. E. Caldwell Company, structural material and transmission equipment; James Clark, Jr., Electric Company, motors and motor-driven machine tools; Dow Wire & Iron Works, structural iron and metal beds; Graf-Webb Foundry Company, stoves; Kentucky Wagon Mfg. Company, farm wagons and electric automobiles; Louisville & Nashville railroad shops; National Foundry & Machine Company, pumps; O. K. Stove & Range Company, Peerless Mfg. Company, grates; Standard Sanitary Mfg. Company, bath tubs and plumbing supplies; Stratton & Terstegge, stoves and tinware; United States Cast Iron Pipe & Foundry Company, Henry Vogt Machine Company, boilers and refrigerating machinery.

George M. Eady, Louisville, has the contract for the reinforced concrete power plant of the Seelbach Hotel of this city. In addition to five Dean pumps, the contracts for which was reported recently, the hotel has ordered a 400-hp. boiler and five automatic stokers from the Babcock & Wilcox Company. This is all the machinery that will be bought, other than several motors, as the remainder will be brought from the old plant.

Additional machinery is being installed in the old plant of the Louisville Bolt & Iron Company, which is to be operated by a new company known as the Louisville Steel & Iron Company, and sheets and bars will be turned out. V. R. Conner, New Albany, Ind., and George H. Holzbog, Jeffersonville, Ind., are principally interested in the enterprise, capital for which is to be furnished in Pittsburgh. Final details are to be arranged and the new company formally organized within a short time.

The Globe Machine Company, Louisville, has filed a petition in bankruptcy, with liabilities of \$3,419, and assets of \$3,886. It has been located at 702 East Main street. R. H. Dietzmann is president.

Prospects for another large coal development which will be of great interest to machinery concerns are given in the announcement of the organization of the Elkhorn Fuel Company, which has been incorporated in Baltimore, Md., with \$30,000,000 capital stock for the development of 300,000 acres of coal lands on Elkhorn creek in Eastern Kentucky. Clarence W. Watson, Fairmont, W. Va., is president, and John C. C. Mayo, Paintsville, Ky., is vice-president of the company.

The High Point Mfg. Company, High Point, N. C., has awarded a contract for the construction of an addition which will double its capacity. The extension will be 40 x 200 ft., and will be used as a finishing shop. The company is a manufacturer of office furniture.

H. E. Evans, Pittsburgh, Pa., manufacturer of gas engines, has acquired a site at Nashville, Tenn., and has had plans prepared for a building 380 x 650 ft., four stories, of concrete construction. Equipment details are now under consideration and purchases will be made in about two weeks for a complete line of machine shop and assembling room machinery, also brass foundry equipment.

The Georgetown Gas Company, Georgetown, Ky., has announced that it will install equipment for the manufacture of gas from coal. It has used oil heretofore.

Ohio County, Ky., is developing into an important oil center, and many new wells have recently been sunk.

Those manufacturing equipment for drilling wells are following the development work with interest. Hartford is the county seat.

The spoke and rim factory of E. E. Doles, Greensburg, Ind., which was recently burned, will be rebuilt, a definite announcement to this effect having been made. Power and woodworking machinery will be purchased.

Henry A. Metz, Randolph Bldg., Memphis, Tenn., is drawing plans for the proposed electric light plant and water system to be constructed at Dresden, Tenn. The combined cost will be in the neighborhood of \$25,000.

Frank Shell, Johnson City, Tenn., is planning the installation of a large sawmill at Roan Mountain, Tenn., where he has purchased 2000 acres of hardwood timber.

A woodworking factory of the American Lead Pencil Company at Lewisburg, Tenn., was burned last week with \$15,000 loss. The company has not announced whether it will rebuild.

The John P. Dale Machinery Company, Nashville, Tenn., reports the sale of a line of woodworking machines to Seagraves & Co., Nashville, who have just entered business there.

J. E. Price, Hattiesburg, Miss., has plans for the equipment of a plant at Meridian, Miss., for the manufacture of dimension stock. Woodworking machinery will be needed, as well as power equipment.

The D. B. Gore Company, Whitney-Central Building, New Orleans, La., is in the market for an 80-hp. horizontal tubular boiler.

The Totty Trunk & Bag Company, Petersburg, Va., has plans for the equipment of a factory to manufacture the lines indicated.

The Barnsville Mfg. Company, Fairmont, W. Va., is in the market for a 150-hp. gas engine. The company operates a woolen mill.

The Scott Machinery Company, Atlanta, Ga., is to establish a factory for the manufacture of sawmills, sawmill machinery, circular saws and other woodworking lines.

Russe & Burgess will establish a large sawmill at Memphis, Tenn. A 9-ft. bandmill will be installed.

Birmingham

BIRMINGHAM, ALA., April 28, 1913.

There have been no deterrent trade factors in the territory adjacent to the Birmingham district, and business in machine tools and machinery continues satisfactory. Coal and ore mining developments call regularly for an assortment of pumps, engines and boilers. The sale of agricultural implements is such as to suggest favorable conditions in farming sections. Hardware dealers are optimistic.

The Sloss-Sheffield Steel & Iron Company, Birmingham, through President Maben, announces 1913 expenditures of \$800,000 for improvements to consist of 280 coke ovens at Bessie mines to take place of those in Birmingham to be abandoned by agreement with the city, three new mine openings at Brookside, two coal washers at Russellville, washer at Brookside, washer at Flat Top, etc.

The Pine Springs Development Company, Jacksonville, Fla., plans a turbine power plant in connection with other improvements at Pine Springs. The capital stock of the company is \$250,000.

The Raeford Power & Mfg. Company, Raeford, N. C., will build a hydroelectric plant to cost \$50,000 at Hope Mills, N. C., to operate cotton mills.

Carl G. Fisher will construct a water works on a tract of 360 acres of land at Miami, Fla.

The Parker Quarries Company, Macon, Ga., has been incorporated with a capital stock of \$50,000 by T. C. Parker, H. K. Burns and T. C. Parker, Jr., to operate granite quarries near Macon.

The Bay Minette Turpentine Company, Bay Minette, Ala., will erect a cooperage plant to supply turpentine barrels.

H. M. Sessions will build a fertilizer factory at Enterprise, Ala.

The city of Tallahassee, Fla., has voted an issue of \$500 bonds for additions to its gas plant. L. M. Lowery is mayor.

The Diamond Flint Glass Company, Vincennes, Ind., has purchased a site near Bessemer, Ala., and plans the organization of a local company for the manufacture of glassware.

The Mutual Ice & Coal Company, Thomasville, Ga., has been organized with W. E. Beverley president and John M. Dekle secretary and treasurer, to build an ice plant.

The Barfield-Erminger Lumber Company, Alapaha, Ga., has been incorporated with a capital stock of \$50,000 by John R. Barfield, Vienna, Ga.; H. B. Erminger, Macon, Ga., and Robert A. Rutland, Berrien County. It will establish a sawmill at Alapaha.

The Georgia Wood Pulp Company, Atlanta, Ga., is planning the building of a factory for the manufacture of paper from wood pulp at Pensacola, Fla. The company has secured options on lands. Martin Ray, Atlanta, is president.

The Consolidated Phosphate Company, Bartow, Fla., has applied for incorporation with a capital stock of \$1,500,000. Clarence A. Boswell is president; Solon G. Wilson, secretary-treasurer; Hugh W. Wear, general manager. The company will engage extensively in phosphate mining.

The Central Alabama Veneer Company, Camden, Ala., is planning to increase its capacity by the addition of a new veneer plant. It will be in the market in about two weeks for a 100-hp. boiler, a small planing outfit, a lumber kiln, a lath machine, a lathe of not less than 60-in. swing and an equalizer of a standard make.

City of Royston, Ga., will vote on May 19 upon the issuance of \$45,000 of bonds for the construction of a water works system.

The city of Zebulon, Ga., has voted a bond issue of \$10,000 for the construction of a water works.

St. Louis

ST. LOUIS, MO., April 28, 1912.

The machine tool market continues with a reasonably satisfactory business, all things considered, but no large lists appearing. Replacement orders and single tool additions to existing equipment make up the business for the most part, but the aggregate is working out very well according to the dealers at this point. There is some demand for second-hand tools. The collections as reported are quite good and the interests concerned see no particular trouble looming up from the tariff talk.

The Lowell Bleachery, Lowell, Mass., which has been maintaining a water testing and experimental plant at St. Louis for a year, has determined from its test the character of plant necessary to use the water found in St. Louis and will, it is announced, begin very soon the construction of the first unit of its large bleaching plant in South St. Louis, the cost involved in machinery, etc., being about \$250,000.

The Forest City Mfg. Company, which has been operating a small plant in East St. Louis, Ill., has concluded negotiations for the establishment of a plant which will require about \$50,000 of mechanical equipment for the manufacture of clothing.

John C. Bulis & Co., St. Louis, have leased new quarters and will equip a plant at 1122 South Twelfth street, for the manufacture of corrugated paper, as well as other material for packing purposes.

The new assembling plant at St. Louis for the Studebaker Corporation, noted last week, will cost about \$100,000, including equipment. Orders have been given to rush work night and day to complete the plant for the early summer business. Motor cars will be shipped here knocked down from the home plant to save freight and distributed from St. Louis.

The Oldendorph Plow & Mfg. Company, Belleville, Ill., has been incorporated with \$10,000 preliminary capital stock for the purpose of erecting and equipping a plant to make plows. The incorporators are Henry Oldendorph, V. E. Ringquist and Guerdon Williams.

The Copper Cable Company, Maryville, Mo., with \$30,000 capital stock, has been incorporated to equip a plant for the manufacture of copper wire cable, etc. The incorporators are Edward B. Cochran, John Z. Curmet, Eldon E. Lloyd, Gideon Matter and John H. Gray.

The Illinois Foundry & Machine Shop, Belleville, Ill., has been incorporated with \$45,000 capital stock by Edward Ebner, Anton Schoenenberger and Fred Ziehnert to equip a machine shop and foundry.

The Western Shingle Creosoting Company, recently reported incorporated with \$600,000 capital stock, with Donelson Caffery of New Orleans, La., as president, has purchased a plant at Texarkana, Ark., with 300,000 ft. daily capacity and has plans for the construction of similar plants at about ten other places in the South. They will use the Paty patents.

The Shreveport Fertilizer Works, Shreveport, La., recently reported incorporated with \$500,000 capital stock, has acquired a site and will proceed at once to equip a plant. S. G. Sample is president, and S. R. Jennings secretary and manager.

The Hope Bridge Company, Hope, Ark., structural steel fabricator, recently incorporated with \$25,000 capital stock, and with Taylor H. Allen as president, has acquired the plant of the Hope Bridge Company, unincorporated, and will, it is reported, increase its equipment.

The Grady County Oil & Gas Company, Amber, Okla., with \$15,000 capital stock, has been incorporated by E. H. Eads, M. H. Bedingfield and M. F. Ikard to equip and operate oil lands which they control.

J. B. Klein & Co., Oklahoma City, Okla., will double the mechanical equipment and capacity of their plant at a cost of about \$35,000.

The Roi-Tan Oil Company, Tulsa, Okla., recently noted incorporated, with offices in the First National Bank Building, is in the market for considerable drilling equipment and other machinery.

The Valley Lumber Company, Camden, Ark., with \$50,000 capital stock, has been incorporated by W. W. Brown, C. W. Niehuss, J. T. Sifford and T. J. Gaughan, and will equip with planing machinery, power plant, etc.

The Algonquin Oil Company, Muskogee, Okla., with \$25,000 capital stock, has been incorporated by George D. Rogers, Charles L. Cunningham and O. M. Little, and will develop oil property which they have obtained.

The Frazee Oil & Gas Company, Lindsay, Okla., has been incorporated with \$20,000 capital stock by J. H. Frazee, of Lindsay, B. E. Tolleson of Headrick, Okla., and C. E. Matheny of Lindsay to operate oil lands which they control.

The Varner Land & Lumber Company, Pine Bluff, Ark., has plans for the equipment of a saw mill near Geridge, Ark.

A band saw mill, slack barrel stave plant, handle factory and kitchen cabinet factory are planned to be built and equipped at Harrisburg, Ark., by Catlett & Foley, of Olney, Ill.

A. D. Crawford has plans for the replacement of the saw mill burned recently with a loss of \$10,000 at Pearl River, La.

A hardwood manufacturing plant with a band saw and resaw equipment will be established at Memphis, Tenn., by Russe & Burgess. The capacity will be 50,000 ft. daily.

A plant with gang saw and two single band mills and other equipment will be established at Logansport, La., by the W. R. Pickering Lumber Company, Kansas City, Mo., under the direction of J. W. Atkins.

A circular mill of 50,000 ft. daily capacity, planing mill, dry kiln and machines for flooring and siding and for dimension stuff will be installed at Laurel, Miss., by J. M. Griffin of Noma, Miss.

The Portland Lead & Zinc Company, Cartersville, Mo., has plans for the installation at once under the direction of its president, H. M. Smith of Portland, Me., of a mill, compressor and drilling machinery.

A concentrating plant is to be installed by Cossey & Brown on mining property being operated by them at Joplin, Mo.

The Whitsett Mill, recently burned with a loss of \$25,000 on mining property at Porto Rico, Mo., post office at Cartersville, will be replaced by Carmean & Squires, the operators.

The Cedar Pulp Company, New Orleans, La., with \$25,000 capital stock, has been incorporated by Thomas Goldman, S. Massman and Albert Coguenheim to equip a plant for the manufacture of sweeping compounds, disinfectants, etc.

The Southern Paper Company is reported as having plans for the construction and equipment of an additional mill at Laine, Miss., to cost about \$800,000.

The Hurley Asphalt Company, recently incorporated with \$50,000 capital, will equip a plant at Woodford, Okla., with a capacity of 3 to 4 tons daily. W. R. Hurley is president and M. A. Benton, vice-president.

E. C. Crovell & Co. of St. Louis, Mo., are reported to have purchased the water works plant at Van Buren, Ark., and to contemplate extensive remodeling and improvement of the equipment.

The Bentonville Cooperage Company, Bentonville, Ark., with \$20,000 capital stock, has been incorporated by W. C. Barnhardt, C. G. Hopkins and O. F. Wyman and will improve the mechanical equipment of a plant acquired by them.

The Columbia Cooperage Company is reported to have plans for the establishment of a \$50,000 cooperage plant at McGehee, Ark., within a short time.

The Mary Milling Company's 200-ton mill at Porto Rico, Mo., post office Cartersville, valued at \$12,000, and owned by Delmar C. Wise of Joplin, Mo., was burned last week. It will be replaced.

Texas

AUSTIN, TEXAS, April 26, 1913.

The enhancement of crop prospects due to bountiful rains promises to have a very beneficial effect upon the machinery and tool trade. The carrying out of plans for erecting a number of cotton gins will now quickly follow. In western Texas, particularly, where there is great activity in agricultural development and town building, the demand for machinery is unusually large at this time.

D. Walker of Austin, and associates, will erect a meat-packing plant at this place at a cost of \$100,000. They will also erect a factory for making barrels and boxes, and will install a plant for manufacturing a new stock feed.

Armour & Co. have awarded the contract to the Gilsonite Construction Company for the erection of 26 cold storage plants which are to be located in different parts of the country. Each plant will cost from \$10,000 to \$50,000. A number of them will be located in Texas.

New machinery will be installed in the municipal water works plant at Fort Worth. It is also planned to equip the south side artesian water pumping plant with additional machinery.

The San José Artesian Hot Wells Company, which was recently organized with a capital stock of \$250,000, will extend the interurban electric system which it has taken over at San José, Texas. It will also construct a complete system of water works at that place.

The Commercial Club of Burnet is promoting the construction there of an electric light and power plant.

The Randolph Gin Company will erect a cotton gin at Randolph. H. Seay is interested.

The Texas Carriage & Top Company, Houston, has been organized to do a manufacturing business. The incorporators are John R. Patton, Charles E. Garbnet and S. W. Turney.

The St. Louis Southwestern Railway will erect a new round house at Texarkana, Texas, and make other improvements to its terminals.

The Rural Cotton Oil Company will erect a cotton gin at Peacock.

The Wise County Brick Company will erect a large brick manufacturing plant at Bridgeport.

The Jefferson Cotton Oil Mill Company will erect a cottonseed oil mill at Jefferson. It will be finished and placed in operation some time this fall.

The City Council of Coleman has taken steps to improve the municipal water supply system. Additional machinery will be installed.

C. F. Speth will construct a system of irrigation on his land near Stanton.

The Kansas City, Mexico & Orient Railway is preparing to erect new shops at Hamlin and make other extensive improvements, including a new round house building and the construction of several miles of terminal tracks. The cost of the proposed improvements will be about \$150,000, it is announced.

The municipal water and light plant at Humble, which was recently destroyed by fire, will be rebuilt.

W. McAshan of Houston, who recently purchased the electric light plant and ice factory at Alice, will make enlargements and other improvements to the property.

The construction of a new sewer system at Pecos, for which bonds in the sum of \$35,000 were recently issued, will soon be started.

The Sutherland Springs Sand Company is constructing a plant at Sutherland Springs for handling sand and gravel.

The United States Land & Sugar Company of Garden City, Kan., has under consideration the proposition of erecting a large beet sugar factory at Artesia, N. M.

The Gila Water Company is arranging to construct a system of irrigation in the valley of the Gila River, near Phoenix, Ariz., for the purpose of reclaiming about 100,000 acres of land. It is stated that a dam will be constructed across the Gila River for the purpose of storing water, and that the cost of the proposed work will be about \$750,000. The American Mortgage Company of Chicago will finance the enterprise, it is stated.

It is authoritatively announced at Monterey, Mexico, that the American Smelting & Refining Company will expend approximately \$2,000,000 in enlarging its smelters in Mexico as soon as peace is restored in that country. Plans for the proposed enlargements have been made and approved.

The Pacific Coast

PORTLAND, ORE., April 22, 1913.

While the demand for machine tools is somewhat more general than a month ago, the business is made up almost entirely of single orders for one or two small tools. Large inquiries are almost entirely lacking, and even in the small trade activity is hardly up to expectations. About the most important business in prospect is the projected reconstruction of the Sumner Iron Works, whose large plant at Everett, Wash., was recently burned. For the present this company has leased the plants of the Phoenix Engineering Works, Tacoma, Wash., and the Vulcan Iron Works, Seattle.

There is some demand for mining machinery in eastern Washington and Idaho, and a few good-sized inquiries are coming out for special equipment for various manufacturing industries, as well as for electrical machinery. The greatest demand, however, is still in connection with the lumber trade, and orders in this line are coming out in very satisfactory shape. A minor feature, but one of growing importance, is the active demand for canning and fruit handling machinery, both in the Puget Sound district and in the interior, where fruit production is running far ahead of former years. In this line many new labor-saving devices are being introduced with considerable success.

The Pullman Mining & Milling Company proposes to build a \$20,000 concentrating plant on its Salmon River claims south of Lewiston, Idaho. It is reported also that a large mill will be installed by the Bullion mine, Wallace, Idaho. The South Fork mine, office at Spokane, Wash., is figuring on a 25-stamp mill and hydraulic power plant.

Bids will be taken May 24 at the Government engineer's office, this city, for constructing and erecting 11 pairs of metal lock gates for the Dalles-Celilo Canal.

The Clough-Hartley Shingle Mill, Everett, Wash., is planning to put up a new shingle plant, in which all machinery will be operated by electric power.

The Portland Woolen Mills Company, St. John's, Ore., is planning a new building for a boiler and generator room.

The Modern Confectionery Company, Portland, is making arrangements for the construction of a five-story candy factory, in which a large amount of special machinery will be installed.

It is reported that the United Comstock Pumping Association, Virginia City, Nev., intends to put in its own electric power plant to furnish a portion of the power needed to operate the machinery and light the deep mines of the Comstock.

The Jamison Mill Company is planning to build a new lumber and shingle mill this summer at Everett, Wash.

The American Lumber Company is building a saw-mill of 100,000-ft. daily capacity at Sumas, Wash.

The Puget Sound Iron & Steel Works, Tacoma, Wash., has put in a new 10-ton electric crane, and will build a 100-ft. addition to the foundry to house a heat-treating furnace for manganese steel.

The Page Belting Company, Portland, has occupied new quarters at 61-67 Fourth street.

The Washington Iron Works, Seattle, is building an addition to its shop, and will install a riveting machine and several other tools.

Eastern Canada

TORONTO, ONT., April 26, 1913.

The Canadian Connecticut Cotton Company, whose mill will be located at Sherbrooke, Que., expects to commence operations before the close of the present year. The company has a capital stock of \$1,750,000, of which \$750,000 is preferred stock and \$1,000,000 common. Both Canadian and American capital will be invested in the company.

At a meeting of the Standard Clay Products, Ltd., April 14, the shareholders decided to start building the new plant at New Glasgow, N. S., at once. When this plant is completed it will treble the present output there.

The Northern Motor Car Company, Ltd., Kingston, Ont., has been incorporated under letters patent with a capital stock of \$250,000. The incorporators are C. A. Macpherson, Hugh Macpherson, A. W. Wheatley, G. T. Richardson and James C. Connell, all of Kingston. It will take over the assets and goodwill of the Northern Motor Car Company of Kingston.

It is understood that the Hood Knitting Company, Lindsay, Ont., which several months ago suffered a severe loss by the burning of the factory on Kent

street, West, will erect a large factory on the same site. It will be built of cement block by the National Concrete Company of Lindsay, Ont.

Melvin Gayman & Co., St. Catharines, Ont., are promoting a canning and preserving business to be established at Dunnville, Ont. Application is being made for a Dominion charter. An option of a 55-acre site has been secured and the preliminary steps of organization are progressing.

Stanley E. Elkin, manager of the Maritime Nail Company, St. John, N. B., it is announced, has decided to enlarge the plant there. Additional machinery was installed in the winter which considerably increased the output. As soon as the money market becomes more settled additional buildings will be erected.

A. E. Dymont has been elected vice-president of the Maritime Coal, Railway & Power Company. Large extensions to the power plant at Chignecto, N. S., and electrification of the colliery plant at Joggins Mines are to be carried out immediately to meet the increased demand for coal and electric power.

Fire in the core room of the Pratt & Letchworth malleable iron plant at Brantford, Ont., did damage to the amount of \$25,000.

Fire did damage to the Wilson Carbide Works at Merriton, Ont., to the extent of \$10,000.

Owing to a shortage in the supply of good lumber, the E. B. Eddy Company, Hull, Ont., will do away with the pulp and wooden pallet department. It will likely start a plant for the manufacture of cardboard boxes and containers.

The Montreal Autobus Company, Montreal, has secured a Dominion charter with a capital stock of \$10,000,000. Its charter members are H. S. Holt, U. H. Dandurand, F. L. Wanklyn, D. McDonald, J. S. Norris, Tancrede Bienvenue, D. Lorne McGibbon, Paul Galibert and J. E. Wilder, of Montreal.

A company to be known as the Oil, Motor & Mfg. Company, with \$150,000 capital stock, has been organized to erect a factory at St. John, N. B., for the manufacture of oil engines and other internal combustion engines. The company will also manufacture a kerosene adapter, so that kerosene may be used in gasoline engines. The development of the oil wells and the oil shales in Albert County is expected to create a growing demand for such engines as this company will produce.

The winding-up order has been granted the Canadian Fibre, Wood Mfg. Company, Ltd., 1191 Bathurst street, Toronto. N. L. Martin has been appointed liquidator.

The Dominion Bronze Mfg. Company will erect a factory at Preston, Ont. J. W. Patterson, of New Castle, Pa., who is superintendent, is now there.

The British Canadian Cannery, Ltd., which was organized a little over a year ago, just completed arrangements for the construction of two additional factories to be located at Port Dalhousie and Blenheim, Ont.

J. H. Taylor, city clerk, Weston, Ont., is receiving bids until May 5 for the construction of sedimentation tanks, humus tanks, dosing chambers, percolating filters, etc., from plans of Engineer T. Aird Murray, Toronto.

Western Canada

WINNIPEG, MAN., April 26, 1913.

The local machinery houses are doing a fairly active business, and they consider the outlook for the summer months very favorable. The volume of new industrial work steadily increases as the season advances. There are indications that a great deal of municipal improvements will be made in western Canada this year, notwithstanding the financial stringency, which is still somewhat acute. Directors of leading manufacturing plans are going ahead expanding, with the confidence that there will be a demand for all that they can produce even with the increased capacity. The monetary situation in western Canada seems more satisfactory, although collections are not very good.

The ratepayers of Calgary, Alberta, have ratified by-laws prohibiting funds for various public improvements, including \$643,200 for the rehabilitation of the water-works plant.

J. W. Simpson, of Worcester, Mass., has been in Edmonton, Alberta, looking over the field with a view to securing a suitable site on which to establish a paper and strawboard plant costing, it is said, about \$250,000.

An agreement has been signed between the authorities of Moose Jaw, Saskatchewan, and the Metzker Seed & Oil Company, Toledo, Ohio, by which the latter will build a large flax mill in Moose Jaw. It is said that it

B. DIESCHER & SONS,
Mechanical and Civil Engineers,
PITTSBURGH, PA.

will be a 24-press mill. The agreement calls for the mill to be finished by April 1 of next year, and the outlay is placed at \$750,000.

The Alberta Co-operative Elevator Company, Ltd., Calgary, Alberta, is preparing plans for the erection of a large number of grain elevators throughout the province this year.

The Fernridge Lumber Company, Ltd., Rosedale, B. C., will install three shingle machines.

The Alberta Lumber Company, Ltd., False Creek, Vancouver, B. C., will erect a dry kiln and add a new planer.

An agreement has been signed between the city of Port Arthur and the firm of Davidson & Black, Fort William, which is to the effect that the latter will build a flour mill of 5000 barrels capacity per day at Port Arthur, the first unit to be 2500 barrels.

Contracts were made between the town of Weyburn, Sask., and the Cleveland Mfg. Company, respecting the intention of the latter company to build and operate a large manufacturing plant at Weyburn. Already 13 acres of land has been purchased in the vicinity of Avondale, two miles south of the center of the town. L. A. McLean, president of the company, who made the final arrangements with the Town Council, stated that it was the intention of his concern to make Weyburn the distributing center for a large output of stoves and furnaces. The amount involved, covering the cost of foundry warehouses, etc., will be close to \$500,000.

The Motor Traction Company of Canada, Ltd., with a capital stock of \$250,000 and headquarters at Calgary, Alberta, has been incorporated.

A new industry to be operated as the Royal Farmers' Machinery Company may be established at Prince Albert, Sask.

Government Purchases

WASHINGTON, D. C., April 28, 1913.

The United States engineer office, Pittsburgh, Pa., will open bids May 21 for building a fireproof power house, furnishing and installing one 115-hp. boiler, one 15-hp. boiler, one steam-driven air compressor, air receivers, feed-water heater, feed-water pump and service-water pump at each of the dams, Nos. 7 and 9, Ohio River.

The Treasury Department, office of the supervising architect, Washington, will open bids May 20 for a new air-lift pumping plant and a water-supply system for the post office, Oklahoma City, Okla.

The Paymaster General, Navy Department, Washington, will open bids May 6, under schedule 5331, class 35, for two multiple-spindle automatic screw machines; schedule 5336, class 41, one hand-lever type, vertical multiple-spindle drill, five turret lathes and two turret threading attachments, one medium-sized cut-off saw, one combination band-scroll and resawing machine and one large universal woodworker; schedule 5337, one combined bar and angle cutter and punch.

The daily consular reports issued by the Bureau of Manufactures, Department of Commerce, Washington, give a number of foreign trade opportunities for machinery and equipment. Detailed information may be obtained from the department. Abstracts of these inquiries are as follows:

No. 10,737—An American consul in the Near East has had inquiries for the names of manufacturers of sawmill machinery. One inquiry is for the equipment of a plant for the manufacture of orange crates and boxes. The motive power of the mill should be such that sawdust and wood waste could be utilized as fuel. A dry kiln will also be required.

No. 10,734—An American consul in Norway states that a local importer and dealer in machinery wishes to correspond with American manufacturers of machinery for the manufacture of oil and guano from fish.

No. 10,751—A foreign coal company is contemplating the manufacture of brick and desires information in regard to equipment for such a plant.

No. 10,780—An American consul reports that a business firm in the United Kingdom desires catalogues of American manufacturers of engines, pumps and engineers' stores with a view to establishing an agency.

No. 10,797—A foreign business firm with connections in British India desires to correspond with American manufacturers of electrical machinery and fittings.

No. 10,824—An American consul in India has had inquiries for the names of American manufacturers of oil engines, cotton gins, corn grinders, sugar and oil seed mills and agricultural tools.

No. 10,826—An American consul in Canada has had an inquiry for a list of firms in the United States manufacturing match making machinery.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids April 22, under schedule 5253, class 1, for one vertical boring and turning mill as follows:

Bidder 78, Manning, Maxwell & Moore, New York, \$26,000; 93, Niles-Bement-Pond Company, New York, \$30,185; 124, William Sellers & Co., Inc., Philadelphia, Pa., \$27,100.

Trade Publications

Iron Sheets.—Newport Rolling Mill Company, Newport, Ky. Folder. Concerned with open-hearth iron, rust resisting, black and galvanized sheets, roofing, siding and formed products. The special features of this iron are described, and there are engravings showing the sheets and products made from them.

Belt Treatment.—Cling-Surface Company, Buffalo, N. Y. Booklet entitled "How to Make Your Canvas Belts do Best Work." Discusses the success of the Cling-Surface treatment for canvas belts, and shows a number of installations where this has been done. In addition to the engravings, data giving the special features are included.

Internal Combustion Engines and Flexible Couplings.—Bogart & Co., 1092 Ellicott square, Buffalo, N. Y. Two folders. The first pertains to a line of internal combustion engines for oil or gas fuel, which are built in both the single cylinder and tandem types. A brief description of the engine is given, the text being supplemented by engravings and line drawings. The other folder is concerned with a flexible coupling for use wherever a positive drive is required. The three types of couplings are illustrated and briefly described, and a condensed table of specifications is included.

Gasoline Storage Tanks and Pumps.—Wm. B. Scaife & Sons Company, 221 First avenue, Pittsburgh, Pa. Pamphlet. Deals with a line of gasoline storage outfits and tanks, garage tanks, pumps, etc. These outfits consist of a tank buried underground at some little distance from the building and connected with the pump by piping. The various outfits and their several parts are all illustrated and briefly described.

Ornamental Iron and Bronze Work.—Spokane Ornamental Iron & Wire Works, Spokane, Wash. Brochure. Presents a general idea of the work done by this company in the manufacture of bank fixtures, elevator cars, inclosures, railings, canopies, stairs, guards, entrance gates, store fronts, grilles, etc. In addition to the views of the work done by this company there is a brief description of the manufacturing process supplemented by views in the plant.

Belt Lacing Machine.—Charles H. Besley & Co., 118 North Clinton street, Chicago, Ill. Folder. Calls attention to the Jackson belt lacing machine. An illustration of the machine, together with a reproduction of the lacing done by it is given, and the special advantages of the coil clasp lacing used are touched upon.

Tap Making.—Bickford Machine Company, Greenfield, Mass. Pamphlet. Contains an illustrated article showing the use of modern methods and machinery in the rapid and economic production of thread cutting taps by O. S. Bickford, treasurer of the company. The material is presented to the company's customers or other large users of taps, not in the sense of a standard of authority in tap making, but rather as the result of the author's experience covering a period of sixteen years. In this pamphlet the uses of the special tap machinery furnished by the company are described, the text being supplemented by numerous engravings of the machines and their parts.

Wattour Meters.—Sangamo Electric Company, Springfield, Ill. Bulletin No. 35. Relates to the type D and D-4 direct-current wattour meters. A description of the construction and operation of these meters is given, the text being supplemented by illustrations of the various parts, as well as views of the different types. A line drawing with the several parts lettered for identification is included.

Rivets.—W. H. Nelson & Son, Taunton, Mass. Folder. Concerned with a line of rivets for tanners and coopers, riveting burrs, spring cotters and flat spring keys. The various sizes are all given together with the prices, and there is also a list of the standard sizes of rivets.

Steam Traps.—B. F. Sturtevant Company, Hyde Park, Boston, Mass. Mailing card. Calls attention to a steam trap which can be attached to radiators without excavation or large expense and requires no adjustment for varying pressures. Wire drawing action is claimed to be eliminated by careful designing. Views of the trap, which is made in five sizes, capable of handling from 1800 to 15,000 ft. of 1-in. pipe installed on a direct radiation system are included.

Boiler Scale Removal.—Joseph Dixon Crucible Company, Jersey City, N. J. Booklet entitled "Graphite for the Boiler." States briefly how Dixon's boiler graphite removes scale from boilers and shows how it should be used. A number of testimonial letters from users are reproduced.

Turret Tool Post.—Phoenix Mfg. Company, Eau Claire, Wis., Marshall & Huschar Machinery Company, Chicago, Ill. general sales agent. Pamphlet. Describes and illustrates the Conradson turret tool post for use on engine lathes, an illustrated description of which appeared in *The Iron Age*, March 20, 1913. The tool post is made in three sizes for use on lathes having swings ranging from 14 to 32 in. and mounts a sufficient number of boring and turning tools to bore a hole, chase an internal or external thread and face and turn the outside, using both roughing and finishing tools on all surfaces. The engravings show the tool post mounted in the lathe for performing various operations, as well as the different kinds of tools that are used.

